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# Proceedings— Symposium on Recreation Choice Behavior

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## FOREWORD

Gaining a better understanding of how recreationists make decisions about the activities in which they engage and the places they go could greatly aid recreation managers. It would improve the effectiveness of communications with recreationists by better focusing on the type of information provided as well as the level of detail needed at the time it is provided. It would provide managers with a clearer understanding of how their actions might affect recreationists, changing the activities in which they engage, the places they go, or the experiences they enjoy. And it would improve the effectiveness with which management can deliver recreation services.

But our understanding of the choice process is poor. Looking at what people do now, or what they did in the past, sheds only partial light on the complex issue. The choices made by recreationists are subject to many influences--knowledge, experience, social pressures, personal preferences, and others. Also, the images of the world held by recreationists likely are different from those held by managers; consequently, managers' efforts to facilitate the choice process by the kind of information they provide as well as the kinds of settings they offer might be hindered.

The papers in this proceedings examine the issue of recreation choice behavior. Six of them were presented at a technical session of the Northwest Science Association meeting held at the University of Montana in March 1984. The remainder were presented at a meeting of the Western Association of Recreation Professionals, held at the same time.

The papers examine the choice behavior process from both a theoretical and empirical perspective. Methodological concerns are also examined.

# **Proceedings—Symposium on Recreation Choice Behavior**

**Missoula, Montana, March 22-23, 1984**

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# CONTENTS

	Page
Choosing Recreation Settings: Processes, Findings, and Research Directions Stephen F. McCool, George H. Stankey, and Roger N. Clark . . . . .	1
Reconceptualizing the Motive/Environment Link in Recreation Choice Behavior Richard Schreyer, Richard C. Knopf, and Daniel R. Williams . . . . .	9
Substitution in Recreation Choice Behavior George L. Peterson, Daniel J. Stynes, Donald H. Rosenthal, and John F. Dwyer .	19
A Developmental Model of Recreation Choice Behavior Daniel R. Williams . . . . .	31
Choices of Wilderness Environments-- Differences Between Real and Hypothetical Choice Situations Jean T. Beaulieu and Richard Schreyer .	38
Do Choices of Sport Fisheries Reflect Angler Preferences for Site Attributes? Charles C. Harris, B. L. Driver, and E. P. Bergersen . . . . .	46
Approximating Recreation Site Choice: The Predictive Capability of a Lexicographic Semi-Order Model Alan E. Watson and Joseph W. Roggenbuck . . . . .	55
Why Here and Not There: The Conditional Nature of Recreation Choice Roger N. Clark and Kent B. Downing . . .	61
Evaluating User Impacts and Management Controls: Implications for Recreation Choice Behavior Harriet H. Christensen and Nanette J. Davis . . . . .	71
Resource and Activity Substitutes for Recreational Salmon Fishing in New Zealand Bo Shelby . . . . .	79
Predicting the Impacts of a High-Voltage Transmission Line on Big Game Hunting Opportunities in Western Montana Stewart Allen . . . . .	86
Methodology for Studying Recreation Choice Behavior with Emphasis on Grounded Inquiry Kent B. Downing and Roger N. Clark . .	101



## CHOOSING RECREATION SETTINGS: PROCESSES, FINDINGS, AND RESEARCH DIRECTIONS

Stephen F. McCool, George H. Stankey, and Roger N. Clark

**ABSTRACT:** This paper reviews the discussion contained in the 11 presentations given at a symposium on recreation choice behavior. It addresses major points of commonality in the papers, as well as areas where differences exist. It also suggests a number of areas in which additional research on recreation choice behavior is needed.

### INTRODUCTION

Many issues confront us as we begin to try to understand recreation choice behavior. Choice is obviously not a random process, nor is it a process that is unique to each individual. Some areas and recreation activities are enormously popular, others are not. However, is the popularity an area or activity enjoys (or lacks) a function of the characteristics it possesses (or lacks), or is it a reflection of other factors such as relative availability, intervening opportunities, or the knowledge or skill held by the participant? Do people choose activities or places because of what they are familiar with, or because they want to "go along with the crowd"?

### RECREATION CHOICE BEHAVIOR--SO WHAT?

How do recreationists choose the settings in which they participate? What are the factors that facilitate and constrain the choice process? Are some factors essential to choice, with others playing only a supplementary role, or do recreationists compensate for the unavailability of one factor by substituting another? Answering the questions is an important step in gaining a better understanding of what people seek from recreation and in determining how management can better provide desired recreation services.

One might ask, "So what? So we have a better understanding of choice and the role of attributes; in the final analysis people will use what is available, regardless of what a manager does." However, if we assume that the goal of recreation management is to provide benefits to the public, it becomes important that we understand how best to do this. Because people use what is currently provided does little other than tell us that they use what is there; it in no way ensures that an optimal level of benefits is being provided, nor does it ensure that the best use of land is occurring. Recreation managers need to address such

concerns as choice behavior and site attributes, just as timber managers identify appropriate silvicultural systems for each timber type. Further, identifying desired attributes might reduce conflict, particularly between renewable resource management activities and recreational values.

A recreation setting may be defined as a place where the combination of physical-biological, social, and managerial characteristics or attributes gives that place value as a locale for leisure behavior (Clark and Stankey 1979). Physical-biological attributes, such as topography, vegetation, or water, provide the basic raw material for many recreational activities. They are also facets of the setting that management can influence, either directly or indirectly, through actions taken to achieve other management objectives. The importance associated with the physical-biological attributes of a setting varies among recreationists, between recreationists and managers, and, likely, with the timing and extensiveness of manipulations of such attributes. This latter characteristic makes it difficult to inventory physical-biological attributes in a fashion that can be commonly interpreted by all users or for all uses.

The following 11 papers in this proceedings explore the issue of recreation choice behavior at both theoretical and empirical levels. They were presented at the 1984 annual meeting of the Northwest Science Association held in Missoula, MT. The theme of choice behavior was selected as a result of the realization by many investigators that existing models of recreation behavior did not adequately explain how recreationists came to use particular settings in the first place, nor did they adequately cope with the linkage between the factors or attributes that comprise recreation settings (and which management is able to influence) and the kinds of experiences recreationists derive from participating in these settings.

### AN ATTRIBUTE APPROACH

The setting--the place where recreation occurs--is clearly a major component of the process within which recreation services are demanded (Driver and Brown 1978; Clark and Stankey 1979). The activities in which individuals and groups participate and the experiences or social-psychological outcomes they derive from such participation are also important. Yet, the setting plays an especially important role in this scheme. It is where activity participation occurs and its attributes and condition can facilitate (or hinder) not only the activity engagement but the satisfactions obtained as well. Ultimately, it is the setting and the specific attributes that comprise it that is the focus of planning and management. Having a better

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understanding of how recreationists choose settings and how they evaluate them can give managers a better grasp of how their decisions affect user judgments of a site's ability to accommodate particular activities as well as provide different experiences.

Social attributes are those elements of the setting that are a function of the recreation use it receives and would include the amount, timing, and type of use. Social attributes are very important to many users and, as with the physical-biological attributes, the importance attached to them will vary among users, between managers and users, and with time, group affiliation, and other variables. Variable interpretations of social attributes can lead to vastly different conditions (for example, the number of other persons in sight or sound) being defined commonly (for example, solitude), or vice-versa.

The type, amount, and obtrusiveness of managerial activity represents the third class of attribute that shapes the nature of recreational settings. This attribute is a subtle influence because many actions are undertaken for the explicit purpose of protecting a particular setting, yet the very presence of the management activity can lead to a change in the kind of place it is. Also, actions instituted by managers to protect resource quality can thwart inadvertently the objectives of the recreationist, leading to sharp conflicts between the two groups. As Christensen and Davis (this proceedings) note, there are often sharp differences not only between the perception of impacts by managers and users, but also between their views as to the most effective methods of contending with such problems.

The relative importance of each type of attribute will vary among recreationists depending upon a variety of factors, including activity interests, experience, and expectations. Regardless of the specific significance associated with an attribute, however, an understanding of the role attributes play in the choice process employed by recreationists is critical to management. It is the setting (described by its attributes) that recreationists seek, use, and impact; it is the setting that managers manipulate, modify, or influence; it is the setting that is allocated to one dominant use or another. In this paper, we briefly review the themes underlying the papers in this volume that deal with how recreationists select settings and activities, and suggest research directions that hold promise for addressing unresolved questions. Understanding choice behavior is also fundamental to management because recreationists will use information about setting attributes in making choices; thus, managers play an important and active role in choice processes through provision of information about attributes.

#### A BROADENED RESEARCH FOCUS

Over the past decade, our understanding of what people seek from recreational engagements--indeed, our understanding of the nature of the recreation

process--has increased greatly. Much of this increased understanding can be attributed to the work of Brown, Driver, and their associates. Their work, built upon the expectancy-valence theories of Ajzen and Fishbein (1980), conceives of recreational engagements as being a behaviorally founded production process. In this conception, visitors are seen as coming to sites with expectations and desires for specific types of satisfaction. They engage in activities at sites where the combination of physical, social, and managerial conditions helps them achieve their desired satisfactions. And, upon leaving the site, the achievement of desired satisfactions is seen as leading to subsequent personal, and perhaps societal, benefits (Brown 1979).

#### Expectancy-Valence Model Shortcomings

This conception of the recreation production process rests upon a model of human behavior in which behavior is rational. It also suggests a reductionist approach to the study of behavior. Nevertheless, the model has served well in identifying systematically critical elements of recreation behavior. It has, perhaps most importantly, highlighted the human experiences obtained from recreational engagements as the key product of recreation management efforts rather than the traditional measures of acres designated, facilities built, or participation recorded.

This focus on the experiences or outcomes obtained by recreationists led to necessary concerns with the recreational setting. It is the setting to which recreationists come; where they carry out activities, which they impact; and from where, in association with the activity, they derive their experience. The setting is also the element of the recreation production model that managers can influence, either directly or indirectly, through their actions. Finally, it logically follows that the characteristics or attributes of the setting should at least influence, if not control, the kinds of experiences that recreationists are able to obtain. For example, if solitude is the desired outcome, then a setting with few others would seem necessary. Conversely, if challenge and risk are desired, a setting laden with signs, barriers, and rangers hardly would be conducive to achieving those outcomes.

The linkage between setting and outcome, however, has proven to be a complex one, lacking any direct or easily predictable relationship. No deterministic tie between setting and outcome exists (nor has such a relationship ever been implied). At best, the link between a particular combination of attributes within a setting and the realization of some outcomes can only be expressed in probabilistic terms, or even more realistically, in broad, ordinally measured statements of likelihood. Some experiences appear to be essentially independent of the setting; for example, physical exercise or family kinship can be achieved in many settings and are not distinguished by varying setting characteristics (Driver and others, in press).

If we look at the setting-outcome linkage from the other direction (Can we identify desired settings if we know the desired outcomes?), there is little change in the situation. For example, Harris and others (this proceedings) report "the few efforts made to predict from perceived recreation outcomes or experience to use of different settings have had mixed results . . . . The more complex and mentally taxing compensatory processes like those operationalized with attitude and motivation theories do not seem to provide adequate representations of recreationists' decisionmaking processes." Schreyer and others (this proceedings) reinforce this position when they state that "the capacity to predict either behavioral or environmental choice through knowledge of motive scores has yet to be demonstrated." However, such expressed dissatisfaction does not constitute so much a rejection of the expectancy-valence model of recreation behavior as it reflects a recognition that this model does not adequately cope with the complex process underlying how recreationists choose settings. This conclusion is a recurring theme throughout the papers in this proceedings.

#### Cognitive Development Models

Following along these lines, several of the papers give particular attention to the role of cognitive development in the recreation choice process. Williams notes that the cognitive development level of an individual refers to the amount and type of information a person has and that this is thought to influence the frame of reference within which that individual makes decisions about recreation choices. Harris and others attribute the growth of interest in the cognitive development model to a number of factors, including the availability of increasingly sophisticated statistical techniques, the need for better definitions of the returns on recreation investments, and, as noted earlier, the general dissatisfaction with the performance of the expectancy-valence model in explaining recreationists' choice behavior.

Because the cognitive development model focuses attention on the information an individual possesses and how that information is used, a number of important questions must be addressed: What types of information has the individual acquired? Through what sources? Through what experiences is this information base updated? How does the acquisition of new information lead to changes in choice behavior? Williams (this proceedings) notes that to distinguish cognitive development from mere change, there must be some underlying progress, order, and direction. Thus, with expanded cognitive development comes increasing differentiation (an increasing recognition of conceptual complexity), as well as increasing specialization (Bryan 1979) or an increasingly refined set of preferences and behaviors. With both comes a more complex manner in which the individual processes information regarding recreation choice.

#### Compensatory Versus Noncompensatory Models

A major issue discussed in several papers is the concept of compensatory versus noncompensatory choice models. Briefly, the compensatory approach suggests that recreationists evaluate setting attributes using a subjectively determined weighting system. A cumulative potential site utility score is derived for each alternative site based on the weight assigned each attribute. The site with the highest potential utility is chosen by the recreationist. The noncompensatory approach views recreationists as ranking the importance of attributes, then evaluating alternative sites on an attribute-by-attribute basis. For each attribute, the least satisfactory site(s) is eliminated, until only one alternative remains.

The compensatory choice model has its origins in the expectancy-valency framework described earlier. By coupling information on the value of specific outcomes with the perceived probability of achieving that outcome in particular settings, compensatory theorists argue that behavioral intentions can be predicted. But the compensatory model is complex and might represent an overrationalized view of recreationist decision behavior. The noncompensatory model is often supported as a simpler and more realistic approximation of how people make decisions, processing information in a sequential fashion from most important to least important.

Harris and others (this proceedings) suggest that respondents use noncompensatory choice processes rather than subjective utility approaches. Watson and Roggenbuck (this proceedings) expand on this assertion by suggesting that a lexicographic decision model is employed by recreationists in site selection. The lexicographic semi-order choice model used in their study assumes that recreationists order the relevant attributes and compare alternatives on the basis of acceptability; alternatives are systematically eliminated until there is only one satisfactory alternative left. Such a model predicted over one-half of the first choices of settings by the subjects in their study, and in nearly three-fourths of the cases, eliminated 80 percent of the alternatives.

Peterson and others (this proceedings) also discuss the importance of examining alternative, process-oriented choice models. In their discussion, they hypothesize that the relationship among some attributes might be lexicographic, while for others it is compensatory. Their research using a nested choice model was only partially supported, and as they conclude, "a good start but far from complete."

What is refreshing in these papers is the willingness of researchers to develop, test, and apply other approaches to choice behavior. These approaches seem to have an implicit recognition of the dynamic nature of choice behavior, and, to some extent, are more comprehensive than earlier attempts.

## Psychological Versus Sociological Perspectives

Nearly all the papers in this volume focus on psychological or individual characteristics of the person in the choice situation. Only a few explicitly address the importance of group processes, normative standards, or other social influences in choice behavior. Although most researchers refer to choices satisfying the needs of individuals, Clark and Downing continually refer to the importance of "group needs," resolving intragroup conflict about alternatives, and the desires of the group in choice behavior situations. Schreyer and others also recognize the importance of accounting for this dimension when they state that "we cannot understand the link between motive and choice unless we know the social context."

One suspects that the social context is a much more significant factor in the choice process than currently recognized and understood. Recreation is almost exclusively a social behavior; decisions about what to do and where to go likely are made within the context of a group rather than by a single individual. Little is known about how groups obtain and interpret information or how conflicting ideas, motives, and desires are resolved. The dominance of psychological models of behavior probably accounts for the lack of recognition of the potentially significant role of group influences on choice behavior. It is important to build this element into models of choice behavior now, rather than "retrofitting" them later when the full importance is identified.

## Choice Behavior and Substitutability

If we assume that recreationists follow some sort of systematic process in their evaluation of setting attributes, how do they accommodate, and respond to, situations where their choice is constrained? What happens, for example, if a key attribute is not satisfactory or missing altogether, but the setting is the only feasible alternative? Is it still an acceptable alternative, and, if so, is it capable of providing the same satisfaction to the recreationist?

Such questions raise the critical issue of substitutability. In the most general terms, substitutability refers to the extent to which one setting could effectively replace another in terms of its ability to accommodate particular activities and to produce particular outcomes. Substitutability is a concept with important implications to managers and planners who are faced with identifying and interpreting the consequences of actions that eliminate or alter recreation settings. Will providing a new setting to replace one eliminated by a timber harvest constitute an adequate and acceptable replacement for recreationists? Are settings just the sum of a set of attributes, or are there antecedent or situational factors critical to the area's definition as a substitute?

The question of what constitutes a substitute goes beyond the onsite characteristics. For an area to

serve as a substitute it must constitute a real choice for the recreationist. The ideally endowed site cannot be considered a substitute if it is inaccessible, or if recreationists are unaware of it.

One can raise the issue of substitutability in terms of activities or the social context within which participation occurs. For example, an individual faced with the loss of certain setting attributes might substitute one activity for another or might substitute a particular activity style for another style in an effort to maintain participation at a favorite recreation site. In this sense, changes in the setting have induced shifts in demand for particular activities. Clark and Downing (this proceedings) also argue that the concept of substitutability can encompass substitutions in social group context.

The extent of the linkage between the concept of substitutability and choice behavior is reflected in its occurrence in the papers in this proceedings. In particular, the paper by Peterson and others (this proceedings) highlights the various disciplinary perspectives and models of substitutability, suggesting that the general behavior involved in the substitution process occurs in a wide variety of life settings. It is therefore likely that in investigating its nature and role in recreation settings we will discover important insights by carefully examining how substitution works elsewhere.

Shelby (this proceedings) details an interesting investigation of the perceived substitutability between two salmon fishing streams in New Zealand. His study provides clear evidence that recreationists perceive important differences between apparently similar recreation resources and illustrates how the foreclosure of one opportunity cannot be presumed to be offset by the physical presence of another in some simple one-for-one fashion. Shelby's results provide support for noncompensatory choice processes.

Allen (this proceedings) specifically addresses the problem of changes in site attributes because of the construction of a major powerline and its influence on big game hunters. His study found that new roads constructed for access to the powerline right-of-way and towers would negatively impact the experience of those hunters seeking remote-type opportunities. For this group of recreationists, a legitimate question to ask concerns the availability of substitute settings, their relative locations, and accessibility--What alternative real choices do they have?

Williams (this proceedings) identifies the difficulties that will arise as increasingly specialized recreationists, with highly specific demands for settings, find an increasingly narrower range of choice in terms of settings that meet their requirements. In the most extreme case, highly specialized recreationists (for example, advanced white water kayakers) might have only one area that offers the combination of attributes they desire. Because of the scarcity of such settings,



their vulnerability to change and the likelihood that users will be displaced are high, a situation not unlike that described for many threatened and endangered species.

#### FUTURE RESEARCH DIRECTIONS

The study of recreation choice behavior has only recently started. However, the selection of papers included in this volume suggests the range of perspectives and research methodologies employed in pursuit of greater understanding of this topic. Much research remains to be conducted. Based upon the discussions in the symposium papers and among participants, the following issues appear to warrant further research attention if we are to achieve a better understanding of recreation choice behavior.

#### Alternative Models

Here we suggest development of alternative choice models, such as those in the disciplines indicated by Peterson and others (this proceedings), and testing those models in a wide variety of decision situations. Such models need evaluation in terms of their ability to guide future research, and also in terms of their usefulness to management. We are encouraged by researchers' willingness to develop alternative models, particularly in the noncompensatory domain. We suggest continued examination of models developed in other disciplines for their adaptability to recreational choice.

One area of needed investigation only briefly discussed in the papers is that of routinized or habitual choice situations. Given the role of such choices in other spheres of everyday life, it is likely that much recreation choice behavior might also be in this category. We need to know not only how this behavior develops, but with what frequency, and how to model it.

The development of alternative choice behavior models implies a need to examine ways in which these alternatives might be integrated. Some approaches to choice might be founded solely in psychology, others in sociology, still others in economics and management science. Our perspective is that choice behavior is actually a set of behaviors and processes, some of which are more effectively modeled by one discipline, others by other fields of endeavor. It is important that researchers begin to think of linking their efforts with the aim of developing more holistic models of choice behavior.

Holistic model building will require collaborative efforts, leading to stronger models that more completely describe and explain the processes involved. The linkage from one discipline to the next will be difficult to establish but should be attempted nevertheless. We feel that such integrative model construction will lead to far greater understanding than continuing to pursue models within one's own discipline.

#### Compensatory and Noncompensatory Models

The papers in this volume focus on examining the differences in compensatory versus noncompensatory choice models and thereby represent the beginning of new research models. It might very well be that for some attributes decision processes are compensatory, while for other attributes such processes are noncompensatory. Watson and Roggenbuck argue that researchers must consider the latter model for it holds great promise for manager-developed information systems, and, consequently, visitors. Clarification of the choice process and its variability across the various contexts of decisionmaking is critical. For example, does the process vary for different setting opportunities, at different levels of resolution in the choice process (for example, macro-versus microscale decisions), or for different levels of specialization or differentiation?

#### Attribute Roles and Measurement

What role do attributes play in the definition of recreation opportunities? Peterson and others (this proceedings) cite consumer theory that posits that the object of choice is not the good itself but rather the attributes possessed by that good. Thus, from both a theoretical and management perspective, it is critical that we be able to identify the composition of recreation opportunities in terms of their attributes.

Within this broad research realm, a variety of specific endeavors are needed. Initially, it seems important to develop a framework within which attributes can be defined and related to one another as well as to other decision factors. Conceptualizations developed in the various disciplines that concern themselves with recreation behavior need to be carefully reviewed for their potential applicability or adaptation. Following this, there is a need to identify the attribute composition of different recreation opportunities. What patterns of variability or stability can be discerned across settings? Are some attributes deemed essential to the production of certain outcomes, or can different attribute combinations produce those same outcomes (this bears on the basic issue of compensatory versus noncompensatory decision processes)? What variability in attribute condition can occur before recreationists define it as unacceptable?

A better understanding of the relevant attributes that define recreation opportunities has many implications. For example, Beaulieu and Schreyer (this proceedings) express concern regarding the current USDA Forest Service ROS Users Guide (n.d.) because of its heavy emphasis on physical-biological attributes in defining recreation opportunities and the relatively minor role accorded social and managerial attributes. They argue that the focus on physical-biological attributes does little to provide managers with information about how other attributes contribute to opportunities or experiences. Additionally, we must acknowledge that if the ROS (or any other recreation planning

system) is founded upon a conception of recreation opportunities comprised of attributes not relevant to users' decisions, its utility is jeopardized. Christensen and Davis (this proceedings) provide clear evidence that user perspectives as to what constitutes the relevant aspects of desirable recreation opportunities are not shared with managers, leading to the imposition of controls that not only fail to address user concerns but that can actually increase problems of deviance and depreciative behavior.

Finally, identification of attributes must be coupled with a knowledge of the relevant units of analysis. For example, we might find that the level of use at sites is deemed an important setting attribute; however, how should that attribute be best expressed? Is it total number of individuals, number of groups, or is it some behavioral measure of who they are, what they are doing and where, and so forth? Recreationist advice on this matter is essential, as it is likely there are differences between managers and users as to how attributes should be measured.

#### Attribute Resolution Levels

A closely related issue is the level of resolution of attributes perceived by recreationists and managers. Schreyer and others (this proceedings) recognize the importance of this direction when they comment that "it is possible to construe the character of an environment as ranging along a continuum from macroscopic to microscopic." Clark and Downing (this proceedings) reinforce this position by stating that understanding the appropriate sequence of choices "may determine which macro and micro site ROS factors are likely to be salient in final place selection." Allen (this proceedings) recognizes the significance of detailed perception of attributes in his study of how big game hunters are affected by a powerline right-of-way and associated roads.

How do recreationists perceive settings? Are the general outlines of settings perceived, or are the details included in the perception? Here again, cognitive processes might be important. As Williams (this proceedings) suggests, increased differentiation and specialization can lead to increasingly specific settings; one would suspect that experienced recreationists perceive attributes at a different level than inexperienced ones. More cognitively developed recreationists probably also rely on different attributes than those less developed, even though the same activity is involved.

#### The Role of Experience

Recognition of the role of cognitive development suggests the importance of examining the influence of prior experience in an activity on one's perception of attributes. Outside of a few papers (for example, Schreyer 1982), researchers have all but ignored how experience influences recreation behavior, including choice behavior. Bryan's

(1979) monograph concerning specialization certainly points to evolutionary processes in development of experience, changes in activity styles, and shifts in setting dependency. Whether one is speaking of images or cognitive sets, establishing linkages between experience and attribute perception and preference is an important task in a society that is becoming increasingly attached in an emotional way to resources.

Understanding how such images are formed is also important in interpreting the dynamics of recreation demand. For example, LaPage and Ragain (1974) note that declining per capita participation in camping might be related to the incongruity between the images held by individuals and created either by previous experience or through various marketing strategies and the conditions encountered onsite.

#### What is Being Chosen?

A fundamental research question involves resolution of this issue: Are recreationists choosing locales for their ability to produce certain social-psychological outcomes? Are they selecting a locale because of its attributes? Do they view recreation sites as places for activities? Or is the site incidental to group processes?

Clark and Downing (this proceedings) argue for the need to develop a "framework for relating people's decisions to choose specific places for particular activities . . . ." However, there exists a substantial literature based on what Schreyer and others (this proceedings) term the "belief . . . that particular patterns of behavior in given environmental settings would yield specific, identifiable kinds of products." Although this seems reductionistic or even deterministic, there is a considerable literature based on this perspective. What is needed is a constructive debate on the question.

#### The Role of Substitution

When decisions regarding recreation settings and activities are constrained, recreationists must consider alternative uses of their time and resources. The issue of what constitutes substitutability in recreation behavior and how recreationists process information to make decisions as to whether a setting constitutes an acceptable substitute for another is one of the most perplexing questions before us. Yet it is one with substantial implications for planners and managers and deserves expanded investigation.

The issue of substitution relates closely to many of the other research topics we have discussed. For example, knowing more about what it is that people choose when they make decisions is critical in the evaluation as to whether one setting is an acceptable substitute for another. Similarly, an improved understanding of the decision itself in terms of the compensatory versus noncompensatory nature of the process needs to be obtained so that

the extent of substitutability between settings can be understood.

#### Psychological and Sociological Linkages

We discussed earlier the emphasis the papers in this volume have on psychological factors over sociological ones in conceptualization about choice processes. Perhaps this reflects the dominant background of researchers today. Perhaps it is suggestive of the ease of measurement. And perhaps there is a presumption that group decisions are simply the sum of individual decisions.

Whatever the reason, we feel that sociological factors (group processes, development of internalized norms, and so forth) are critically important in choice behavior. Most recreation behavior in wildland settings occurs in group situations. The dynamics of group interaction, the effects of differing leadership styles, the balancing of conflicting interests among others, must all play a significant, if not dominant, role in choice behavior. It would be a mistake to develop models of choice behavior that somehow did not account for or include these factors.

#### Choice Behavior Disruption

We have recognized the implication that a shift in research focus from outcomes to process results in a much more dynamic view of the world. But even with the focus on a dynamic model of choice behavior there is a temptation to overlook disrupting factors such as changes in life cycles or site management. Somehow, research should also account for these disrupting situations: What are they? Under what conditions do they occur? How frequently do they happen? What impacts on the choice process do they produce? It could be that a model of choice behavior as eventually settled upon might be a model of behavior that is, statistically speaking, "average," but that actually occurs only infrequently. Given the natural variation in human behavior, disruptions likely are the rule rather than the exception.

We noted earlier that a great deal of choice behavior might be fairly well routinized. There is great security in maintaining routine behavior and it is likely this behavioral mode carries over into recreation behavior. However, what happens when this routinized behavior is disrupted? What coping strategies do recreationists employ to deal with the disruption? Is the disruption followed by a resumption of the original behavior or does it lead to altered behaviors? If the latter is the case, does the alteration collectively involve activities, settings, and outcomes, or are one or more of these elements of behavior maintained?

#### Experimental Design Needs

We are not the first to note the near total dependency on the ex post facto design in recreation research. Clark (1977), among others, has

commented on the intrinsic limitations and utility of this design in answering questions of interest to researchers. In the field of choice behavior, we suggest more creativity in designing experiments, with alternative treatments, control groups, and so on to test hypotheses. In this respect the Williams paper here represents a desirable research direction.

Progress in understanding recreation choice behavior and the associated issues we have discussed will necessitate innovative methodological approaches and, likely, a reduced dependence upon cross-sectional surveys as a primary data source. In a paper not presented at the symposium, but included here because of its significance to the study of choice process, Clark and Downing develop a strong rationale for a qualitative, grounded approach to the investigation of choice behavior.

#### CONCLUSIONS

Intrinsic in the notion of recreation choice behavior is the recognition of the dynamic nature of human activity. Choice behavior, what it is, and how it occurs, is inextricably related to setting attributes. We suggest that a greater understanding of how people choose among alternatives will lead to a greater awareness of what settings are, and how managerial activity influences those settings. Greater understanding of the choice process will also allow managers to develop more sophisticated techniques to softly, lightheartedly, manage both sites and visitors.

Although the choice process is complex, it seems imperative that we gain a better understanding of it. For example, if we better understood the kinds of information recreationists consider essential to make decisions, we could better tailor information programs for people to use. Understanding more about the decision process could influence how information is made available as well as its timing and location. Knowing the importance of decision factors could also aid prediction of the kinds of impacts stemming from alterations in settings and the implications and consequences of such changes. And an understanding of the choice process is necessary to many of the education-oriented management programs in which there is increasing interest.

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# RECONCEPTUALIZING THE MOTIVE/ENVIRONMENT LINK

## IN RECREATION CHOICE BEHAVIOR

Richard Schreyer, Richard C. Knopf and Daniel R. Williams

**ABSTRACT:** Effective inventory, management, and planning for recreation resources depend upon knowing why persons choose certain environments to attain specific goals, and what elements in those environments facilitate goal-attainment. Research focused on relating motives for participation to specific components in the environment has had only limited success. This paper proposes an alternative organization of the motive-behavior/environment relationship intended to improve the predictive power of this line of research. The model is founded on an attempt to separate the process of recreation behavior from the content (i.e., the specific overt manifestations of behavior). The process of recreation behavior is seen as the attempt to attain a desirable state of consciousness which is experienced as satisfaction in recreation.

### INTRODUCTION

Perhaps the most significant contribution of social scientists conducting recreation research during the last decade has been to focus attention on the goal-directed nature of recreation participation. We have come to dismiss recreation as being random or spontaneous behavior, conceiving it as directed, purposeful behavior intended to realize specific outcomes for the individual. Further, research has supported the notion that these outcomes, rather than the activity pursued per se, motivate participation.

These new perspectives appeared to have provided a model of the recreation resource management process that allowed direct comparison to other resource production efforts. These psychological "outcomes" became construed as products delivered by the resource management process. Ostensibly, they could be measured and evaluated, allowing them to be compared to other products, both recreational and non-recreational, which might be produced by the

resource. Lack of such comparability has troubled recreation resource specialists for years.

Further, there was the possibility of defining direct links between given products and environmental conditions leading to their production. Particular patterns of behavior (e.g., different recreational activities) in given environmental settings would yield specific, identifiable kinds of products. If these could be cataloged, then planners could develop a means for inventorying outdoor resources according to the products they yield, and specify the conditions necessary in those settings for the production process to occur. This would be analogous to inventorying and managing a forest environment in order to maximize the production of certain classes of timber products. In fact, a major resource management planning system, the Recreation Opportunity Spectrum (ROS), is being implemented based on these assumptions.

While insights from social science have resulted in a marked sophistication in understanding the nature of the recreation resource in general, the dreams of defining the production process in operational terms have been slow in coming to fruition. Studies have reported differences on scales developed to measure motivation for participation across groups engaged in different outdoor activities (Knopf 1972), among different persons engaged in the same activity in the same setting (Schreyer and others 1976; Schreyer and Nielson 1978) and in different outdoor settings (Knopf and others 1983). But while studies yield differences on motive scales attaining statistical significance, the studies generally fail to register substantial differences in absolute scale values. In other words, these studies have not provided compelling evidence for variations in motivation which can be attributed to either activity or setting.

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After more than a decade of intensive research on the dynamics of recreation choice, capacity to predict either behavioral or environmental choice through knowledge of motive scores has yet to be demonstrated. It is possible to argue that such scales are not intended to predict at high levels of specificity. This leads to broader questions, however, concerning how the recreation product output model is in fact expected to work, and which variables are necessary to provide what degree of predictive

power. Such questions have theoretical as well as pragmatic implications.

Our purpose in this paper is to take a closer look at the conceptual bases for understanding the link between motivation and the choice of recreation behaviors and environmental settings. We will begin by providing a brief statement of the model of choice behavior as it currently exists. We will then examine a number of issues concerning application of the model. Finally, we will show how a different organization of the same variables might increase the strength of the link between psychological variables and environmental behavior. It is not our purpose to provide a new model of human behavior. Rather, we wish to provide an alternative perspective as to how the model might be elaborated through a more useful specification of the various concepts and their interrelationships.

#### MOTIVATION FOR PARTICIPATION AND ENVIRONMENTAL CHOICE

The prevailing view of recreation participation suggests that a person selects a given behavior in a specific environment to attain desired psychological outcomes. In essence, the person is motivated to pursue certain behaviors to gain psychological rewards. Thus, outcomes are operationalized in terms of identified psychological rewards.

The individual is assumed to be "rational," selecting from a known repertoire of responses those behaviors which, based on past learning and reinforcement, are judged most effective in obtaining the targeted rewards. By definition certain behaviors are consequences of motivations to obtain specific desired psychological outcomes. Figure 1 illustrates the components of this model of recreation behavior, which is in reality a specific application of a general model of human behavior.

The environment plays a major role in this model. Different environments provide varying opportunities to engage in certain behaviors. This affects the repertoire of responses available to the individual. Conversely, certain environments may be sought precisely because they allow behaviors which will yield the desired outcomes. Thus, the link between motivation and behavior cannot be understood in itself, but must be seen as motivation X leading to behavior A in environment B. It is the combination of behavior and environment that defines the "experience opportunity setting" (Driver and Brown 1978), the fundamental unit for identifying the products which may be produced from a recreation resource.

If these assumptions are valid, then it is necessary to be able to predict what outcomes are produced by different combinations of behaviors and environments. If this is not the case, then there is no basis for operationalizing the concept of desired outcome as a planning/management tool, except as an anecdotal heuristic that helps managers better appreciate that "people are different." The following section will describe problems which have been encountered in attempting to establish these relationships.

#### Issues in Understanding Motivation-- Behavior/Environment Linkages

While the model shown in figure 1 suffices as a general explanation of human behavior, we must be careful about applying it to any specific circumstance. It is one thing to assert that a given motive will result in a person acting on it, and quite another to say that an observed behavior explained ex post facto was the direct inevitable consequence of a certain motivation. While it is possible to argue that the effort to satisfy certain needs involves specific behaviors in a given environment, that does not satisfy the conditions for determining which aspects of either the behavior or the environment will allow for goal attainment.

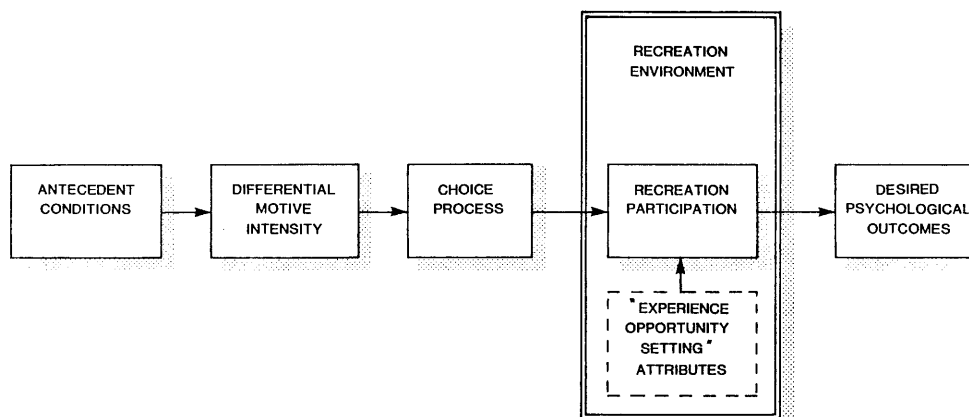


Figure 1.--Basic model of recreation behavior.

## The Directness of the Link

A key consideration in the attempt to classify recreation behavior is the extent of the directness of the link between behavior and motivation. Keep in mind that there are many ways in which behavior may be initiated. Models presented in recreation motive research imply a more direct correspondence than is likely present. Three aspects of this problem will be discussed in this section. The first has to do with the level of generality at which the various concepts are organized. The second involves the problem of motive intensity. The last concerns definitions of the concepts being used.

Levels of organization.--We assume that there are elements of an environment which facilitate goal attainment. If that were not true, it would make no difference where a person was at any particular point in time. We are perplexed, however, by the seemingly insurmountable challenge of not being able to identify deterministically the elements of an environment which actually serve as facilitators.

The major issue we are dealing with here is how to organize the concepts of motive, behavior, and environment in such a way that we know what is to be predicted. For instance, the term "behavior" can mean "to recreate," or it can mean "to go for a two-day backpacking trip with a close friend." It can also mean spending the greater part of the day while on that trip sitting in a comfortable place reading and engaging in casual fishing. Environment can mean "the outdoors" or "a wilderness" or "the Bridger Wilderness" or "the southern tip of Green River Lake at the north end of the Bridger Wilderness." At what level is motive to predict either behavior or environment?

While a set of scales can be devised to measure "motives," there is no guarantee that these do not relate to behaviors or environments at differing levels of organization. One motive may relate to the broadest of behavioral categories, while another may be able to predict a much narrower set of behaviors. This can also be applicable for the range of environmental conditions in which such behaviors may be pursued. Part of this problem may be due to the fact that we may not be controlling for the level of organization of motives as well. We could start at the most general level of "approach positive outcomes," move down to the desire for "affiliation," then to the need for "doing things with the family" and finally to "kinship bonding." Each will be more specific in its implications for behavior. Unless the level of focus is made a direct element of research, these relationships will continue to be masked by spurious influences.

Motive intensity.--Motive scales request a rating by the individual of the relative

influence on the specific behavior of the reasons listed. The assumption is, the more important the rating, the more direct causal link between that motive and the behavior being studied. This is not necessarily the case. General motives scales may not be able to capture the overall importance of behavior to need-fulfillment.

For instance, two persons receive a questionnaire upon completion of a river trip, and are asked, among other motive questions, how important was the opportunity for escape. Both mark "of utmost importance," and both are correct. One was there, however, without strong allegiance to the particular activity. He had a strong desire to get out of town for the weekend, and river-running seemed like a good thing to do at the time. Going for a ride in the hills would have done just as well, as would going to the movies. The other was a person who carefully evaluated every plausible alternative for meeting her needs at the time, and concluded that only a float trip on that particular river in that particular setting would yield the exact requirements she needed to gain a sensation of escape. Both persons have very different resource requirements, exhibit very different behaviors on the river, demand different support facilities, have differing opinions about management and conflict when they interact. Yet both elicited identical responses for the motive scale. Thus, the score of intensity for a motive scale may not be an accurate predictor of behavior, because relative intensity is not accounted for.

Conceptual semantics.--A major part of this problem may result from problems with the semantics of recreation. Few concepts have been defined with precision, resulting in unclear conceptions of how people are likely to behave, or to choose recreation environments. For instance, the Recreation Opportunity Spectrum is founded upon a continuum of primitive to urban experience (Buist and Hoots 1982). Is it really the "degree of primitiveness" that constitutes the specific aspect of outdoor environments which dictate the character of outcomes generated? We agree that primitive environments provide opportunities for self-reliance and solitude, for spiritual experience and challenge (Brown and others 1978). But can we conclude that urban environments do not? Ask any street gang member about self-reliance and challenge. Ask devout believers of any faith where they get their spiritual experience. As for solitude, why do we have locks on bathroom doors?

This underscores the problem of a possibly misplaced focus on what aspects of the environment are important to people in the outdoors. Even if the "primitive-urban" continuum as posed by ROS is proved to be statistically associated with variation in the delivery of outcomes, we cannot necessarily conclude that we have construed the correct aspect of environmental variation. How much of what we describe as "primitive" really implies other environmental attributes that covary with

primitiveness, but are not really the same? For instance, research in environmental psychology has generated findings that one of the most fundamental dimensions along which people differentiate environments is natural/manmade (Ward and Russell 1981). This may not be equivalent, however, to the primitive/urban dimension. The former may have to do with the presence or absence of certain patterns of stimulation which may be more or less preferred in processing information about the environment (Kaplan and Kaplan 1978). The latter may have more to do with the presence or absence of facilities which may be more or less preferred in accommodating levels of physical comfort in the environment (Schreyer and Roggenbuck 1978).

### The Nature of Decisions

The third box in figure 1 shows that the link between motivation and environment/behavior is through some sort of choice process. Decision-making is extremely complex; recreational choices are influenced by certain aspects of decision-making which tend to confuse our analysis of the motive-behavior/environment link. Two of these will be described below. One has to do with the way motives are involved in decisions; the second deals with the regularity of decision-making.

Layers of decision-making.--When we ask a person what reasons were important for engaging in a particular activity at a specific point in time, we assume the answers they give are directly relevant to that participation. There are several layers, however, of decision-making underlying the choice to engage. Consider the case of a person choosing to go canoeing on Jackson Lake next Saturday. At one level, there are a set of reasons why the person elected to engage in recreation as opposed to non-recreation alternatives, such as doing chores or fulfilling social obligations. At a second level, there are a set of reasons why canoeing was chosen for recreation over many other possible alternatives. Why does the person want to canoe rather than hike, assuming he/she does both? At the third level, there are a set of reasons why Saturday at a certain time was appropriate for this behavior, as opposed to other possible times. At the fourth level, there are reasons why Jackson Lake was chosen instead of the Snake River.

All of the reasons involved in all of the levels of decision-making will be included in the person's self-report of reasons for engaging in that specific behavior. From one perspective, they are indeed all relevant to the situation, and it is appropriate to consider them to gain an overall profile of the activity. Motives, however, precipitating the general decision to recreate will not discriminate among specific recreation activities. Motives precipitating the decision to engage in canoeing as opposed to hiking will not be able to distinguish between different types of canoeing opportunities for

planning/inventory purposes. In other words, the reported motivations for making a choice to participate may not be sufficiently detailed to allow for the definition of an experience opportunity setting.

Routinized decision-making.--Rational models of decision-making imply a direct correspondence between the need state at a given point in time and choice of behavior. Humans, however, have the capacity neither to exhaustively analyze the requirements for an optimal existence nor to analyze the consequences of every behavioral alternative. Indeed, humans might be more characterized by the regularity of behavior patterns.

The patterns of behavior one adopts may most likely be continuations of appropriate forms of expression one has learned over time rather than specific and rational attempts to fulfill existing needs of the present. One's desire to go canoeing, for example, may really reflect the fact that canoeing is something that person does every August. Over time the behavior has satisfied needs which have surfaced in the past. There may be a package of outcomes that a person will gain through such participation. The specific behavior, however, may have little to do with the need state of the individual at the time of decision.

We must understand that the more routinized a behavior, the more likely that motives will be general and not specific to the behavior itself. The study of motives, however, usually ties them to the specific behavior and specific environmental features. An alternative behavior and/or environment may have been more functional, given one's motives at the point of decision. But the individual continues engaging in what has historically been beneficial. As long as some motives are serviced, the cost of searching for new behavioral options is avoided. The behaviors and the need state are only incompletely linked.

### Antecedent Conditions

It is also possible to assert that the link of motive to behavior and environment cannot explain the situation unless more information is available. Such information may have to do with what are often referred to as "antecedent conditions" (see figure 1). These may have to do with the nature of individual differences that will determine which motives are likely to initiate behavior, and what behaviors and environments are seen as being best suited to attain the desired outcomes. Such forces may also influence the nature of the choice itself. Beyond mentioning that they exist, there has been little in the way of systematic research inquiry into what facets of individual diversity may be most important to targeting motives to specific behaviors and environments.



One of the most important of these factors is the social milieu. It has often been suggested that social motives themselves may be among the most important reasons for recreation participation. Social dynamics may do much to mask the link between motive and environment/behavior. Given that many environments and behaviors may be selected to attain various outcomes, the specific behaviors and environments observed may be more indicative of socio-cultural values about participation than of the inherent characteristics of either.

We often recognize the importance of obligate functions, or the tendency to go along with certain types of behavior because friends or family are so engaged. Such behavior removes direct need fulfillment from the choice process, except for the social needs. As such, a person's answers on a motive scale may reflect nothing more than a social mythology, a shared belief about what one is supposed to be getting from the participation. People tend to play out social scripts, which makes the process of the behavior more significant than the outcomes. Thus, we cannot understand the link between motive and choice unless we know the social context.

The amount of information available to the individual may also affect the link between motive and choice of a specific recreation setting. Persons may select generic types of environments in which to recreate based on the assumption that the attributes desired will be present. There may be little correspondence, however, between what is encountered and what one desires. Decisions can often be made based on images which are not entirely correct. For instance, a person may choose to visit a specific national park assuming it will have visitor services generally associated with such environments, though this may not actually be the case.

Thus, if research measures motives which resulted in the choice of a particular environment, but the environment does not actually conform to the image that resulted in the choice, then the link between the two will be assumed to be stronger than it actually is. The likelihood of this occurring increases to the extent that conditions in environments are changing. Rapid shifts in the nature of social interaction, managerial regimentation, and facility development can increase the likelihood that reported motives represent conditions which may not actually be in the environment under analysis.

#### RECREATION STATES AND GOAL-ATTAINMENT

These issues, while troubling, should not be insurmountable. Rather, we believe there is a need for us to examine the motive link to environment and behavior in light of these concerns, and to try to begin identifying approaches to the problems that will move in the direction of greater predictive power.

We wish to propose an elaboration of the motivation-based recreation behavior model. It is founded not only on the addition of key concepts required to predict specific behaviors and environmental characteristics sought, but also on a conceptual clarification of the meaning of motivation. The approach is founded on a systematic separation of elements of the model which describe the process of recreation behavior and those which characterize the content or specific manifestation of that behavior. It also seeks to describe the increased significance of antecedent conditions influencing the working of the model.

Figure 2 presents the components of this model. In the following sections we will explain the nature and significance of the

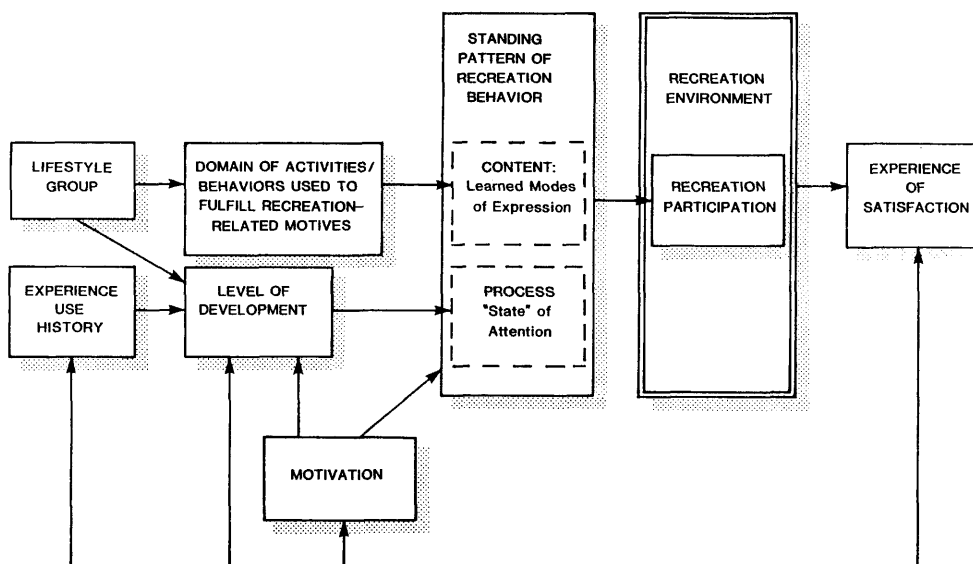


Figure 2.--Elaborated model of recreation behavior.

interrelationships among these components. First, we will examine the process of recreation behavior from a cognitive perspective. Next we will show why it is useful to consider "recreation experience preferences" (or what we measure to represent motivation) as the content of recreation participation. We will then show how the recreation environment fits within this model. Finally, we will discuss some issues related to the measurement of these concepts.

#### Recreation as On-going Process

State vs. outcome.--In resource management-based research, we have tended to emphasize identifying and inventorying the outcomes of various choice processes (which are measured as "recreation experience preferences"). Motivation is assumed to be part of the process by which outcomes are attained. We believe it is more useful to consider the various motives as the content of recreation behavior, and that the process is more correctly expressed through the dynamics of the states of attention applied to such behavior.

An increasing amount of research is being pointed toward understanding the subjective state of the experience of leisure (Mannell 1982; Dirkin 1983). The focus is less on documenting the "products" of leisure and more on understanding the processes or psychological states experienced during leisure involvement. This research has developed along two fronts. One seeks to define what are the essential components of what people describe as leisure (Unger and Kernan 1983). That is, what is leisure itself; how do people know leisure when they experience it? The second is more cognitive in nature, concentrating on the more extreme states of consciousness afforded by human behavior, commonly described as flow or peak experiences (Csikszentmihalyi 1975; Murphy 1977). This research explores the requisites for bringing these states into existence.

Process-oriented research reports what the person experiences while recreating. This may be what we describe as "satisfaction" in progress. There is the tendency for people to describe the subjective feeling as "fun." The rationale for engaging in recreation behavior is often described as the desire to "have fun." This is usually dismissed by motive theorists as an inaccurate expression of the "real" reasons why one recreates, which are to attain rather specific products that are delivered by conditions present in environments.

We believe however that there is more than meets the eye to the concept of "fun." Fun--the enjoyment of a process--may in itself be a motivator for engagement in outdoor recreation, a notion which may have little to do with meeting needs created in non-recreation environments. To the extent that recreationists make decisions based on "having fun," the predictive utility of traditional motivational

models may break down. Our desire now is to describe the concept of "state" as a human motivator, and to suggest how that concept can help us better organize our conceptions of the relationships between recreational motives and behavior/environment choices.

The meaning of "fun."--The dynamics of leisure involvement are in fact more complex than previously described, as there are many possible states which are subsumed under the notion of "fun." The varied state could hypothetically be arrayed along a developmental continuum from least to most complex in terms of the degree of involvement of the cognitive arousal process.

At the most fundamental level are states involving involuntary attention (James 1892), where consciousness is free to attend to whatever is inherently gripping. By definition, there are no distractions, as there is no need to suppress unwanted stimuli (Kaplan 1978). Such processes may be most frequently associated with casual removal from one's more mundane surroundings, perhaps described best as "letting the mind wander." The mind is free to follow its will; there is little in the way of concentrated involvement.

As we move up the continuum, we find states that could be described as sensory arousal. These states would involve momentary and pleasurable stimulation of sensory equipment beyond its rested homeostatic level. At the higher end of the continuum are states involving flow experiences (Csikszentmihalyi 1975), evoking sensations of self-environment fusion and loss of time-consciousness. States at the top of the continuum might best be epitomized by what Maslow (1971) described as peak experiences, perhaps the ultimate display of human cognitive capacity.

Why are these states relevant to recreation? From a cognitive perspective, there is value in being able to pay attention only to those stimuli which one desires to attend. Taken as a process, we can say that satisfaction represents the ability of the person to engage in desired behaviors, paying attention to whatever will attain a desired state. When constraints offered by the environment are not sufficiently critical to cause the person's attention to deviate from the tasks at hand, that person can be described as satisfied. The feeling the person has is one of having fun.

The capacity to engage in a desired degree of attention is experienced as positive by the individual. We believe the primary value of recreation lies in its ability to deliver these kinds of states. We posit that people are oriented to, and make choices based upon, the prospect of attaining the state itself, rather than the various externally defined products that may be manifested through those states. Since the subjective feeling associated with any of these states, regardless of location on the continuum, can be experienced as "fun,"

recreationists are being accurate in their stated intent "to have fun" as a major motivation for recreation participation.

If there is a desire to be able to control the circumstances of one's attention, and if the opportunities to do so are more strongly limited in day to day situations, then more emphasis may be placed upon leisure situations as vehicles to attain such states. The process of the state is what people are attracted to.

In figure 2 we represent the process of attaining a certain state as being part of the standing pattern of behavior, the routine pattern of participation which characterizes the way a person goes about engaging in recreation. The cognitive process, however, is only one component of that standing pattern. In order to understand the behavior, we must also know what characterizes the content of that behavior. This is where motivation comes in.

#### Linking Motives to States

Where do our traditional conceptions of recreation motives in general and motive scales in particular fit within the context of this state orientation? People do identify motivations which they say precipitate leisure behavior beyond mere fun. Our model still deals with goal-directed behavior, but it simultaneously calls for a much more integrated or global concept of goals. We believe that motives should be construed in terms of a relatively limited set of cognitive states that people pursue during leisure.

We recognize, of course, that it has been possible to develop a number of complex motive scales which people, through their responses, seem to affirm. What is being responded to however? Are these scales a measure of what people are searching for, or of learned modes of expression which yield access to the desired cognitive states? We believe that our current use of motive scales tends to intermingle goal-directed behaviors with modes of expression. The concept "experience nature" could be a means by which people engage in behaviors designed to get into cognitive states at all points along the continuum. As such, we would not expect it to be very predictive of behavior. Similarly, persons may have learned to attain a level of sensory arousal through different paths, one doing it by way of achievement, another through leadership/autonomy.

If the states people pursue are few and the routes to them are many, this implies a great deal of potential functional equivalency across a wide range of activities and settings. We believe that people tend to choose particular activities in specific environments for such innocuous reasons as convenience, access, time available, money, and familiarity. The specific domain of activities people select from is circumscribed by their socio-cultural value

system, which in turn is strongly influenced by the opportunities that are immediately available.

While most discussions of recreation behavior acknowledge these facts, they tend not to recognize that these very variables limit the capacity to predict preferred behaviors and environmental arrays. From the perspective of ultimate function, these behaviors are highly interchangeable. Directedness toward particular activities and settings thus becomes a matter of opportunistic convenience rather than a matter of rational examination of the differential rewards which might accrue from a host of alternatives.

The focus for research should not be on motives as predictors of behaviors and environments. Rather, it should be on those elements in the individual's environment that determine which modes of expression are linked to which cognitive states. These variables will allow for a more useful prediction of behavior and environmental choice. We are thus proposing that the notion of motive must be considered as part of three-part construct including antecedent conditions, motive (learned pattern of behavior) and cognitive state.

How can the indicators of cognitive state best be represented? This remains to be determined. In figure 2 are shown two factors we feel, however, are of major potential importance: experience use history and lifestyle. Experience use history relates to the nature and extent of information available to persons in making recreational choices. It is also likely related to the extent of progression along the developmental continuum of cognitive states applied to recreation.

The social milieu, the values expressed by the lifestyle with which the individual identifies, will provide directed information concerning both behaviors and environments seen as desirable to attain various cognitive states. Cultures will likely also provide input into the extent to which certain states have status value or are seen as being "unhealthy." Thus they will also influence the level of development sought through recreation.

To the extent that these lifestyles are shared across wide segments of a culture, there will be a consistency in patterns of recreation participation. Within this model, recreation planning involves not so much providing the opportunity to engage in behaviors facilitating certain outcomes as it involves facilitating certain generally accepted modes of expression which allow persons to attain cognitive states.

#### The Role of the Environment

We have already stated that environment features do make a difference to persons in terms of their desired experience. There continues to be

the question of how the environment should best be represented in light of this model. A basic concern is how to define the appropriate level of specificity at which attributes should be represented in predictive models. How stringent are people's requirements for the attainment of desired states?

It is possible to construe the character of an environment as ranging along a continuum from macroscopic to microscopic. At the macroscopic level, we see environments basically as settings, as holistic environments which affect behaviors by very broad and generalized features perceived as a whole by the individual. At the microscopic level of analysis, we see environments as an array of attributes, as collections of individual entities, each of which may have the power to impact certain aspects of human behavior.

We believe that the most useful organization of environment for the study of behavioral choice is at the holistic level rather than at the attribute level. This presumption seems more in line with emerging conceptions of the organization and operation of human cognitive processes, and the attendant limitations in our capacities to evaluate a broad range of features as we make discriminations among environments. Rather, persons tend to match environments (as well as other objects or aspects of life) to broadly defined representatives of categories of similar environments, or "prototypes" (Rosch 1978; Mervis and Rosch 1981).

We recognize, of course, that perceptions will vary from most specific to most general. We feel, however, that the major dimensions of recreation behavior are aligned with more general organizations of environment than traditional paradigms in outdoor recreation research acknowledge. We believe people do not search for specific elements of the environment as much as they search for settings which will allow them to behave in the ways they desire--for settings which will give them sufficient leeway to attend to that which will allow for the attainment of the desired cognitive state.

This line of thought may initially sound consistent with the notion of the "experience opportunity setting" as described in the literature (Brown and others 1978). But here we are implying much more looseness of structure on what needs to be present in the environment. As remarkably resourceful and adaptive organisms, humans have considerable capacity to engage in desired behaviors under a broad range of environmental situations (Stokols 1978). Much of this position is founded in our belief that outdoor recreation behavior is primarily used by people to help them maintain certain states of consciousness. We feel that people can be extremely adaptive in attaining these states, and should not be construed as being passive victims of whatever external forces may be present (Knopf 1983). As long as outdoor settings meet minimum criteria for behavioral flexibility to allow one to pay attention to

desired stimuli, then the larger portion of the collection of environmental attributes becomes virtually irrelevant.

This approach raises a new wave of unanswered questions. At what level are environmental features interpreted by recreationists acting in those environments? At what level can the character of the environmental setting be defined? At what level are constraints on free initiative perceived?

While the answers to such questions must await future research, we believe there are few elements in outdoor settings which functionally serve to constrain free initiative beyond providing the basic capacity to engage in an activity (one does need water for canoeing). We feel that the most important factors influencing free initiative lie not in the external environmental backdrop, but in the social milieu in which the recreation activity takes place, and in the managerial policies controlling that social milieu.

As social interaction is very fluid, it becomes difficult to associate particular patterns of interaction with specific forms of environmental setting (Lee 1972). Physical setting is seen not so much as a facilitator or controller of behavior, as it is a repository for the social definitions of the appropriate behaviors.

Resource inventories focus on physical characteristics because they are easy to measure. We focus on them, however, for the wrong reasons. The presence of water obviously allows the pursuit of canoeing. However, it is the social definition of the setting that will determine what behaviors will take place. Thus, we believe that those elements which most likely constrain free initiative (and therefore thwart the attainment of the desired states) are least likely to be captured in traditional motive-environment choice models.

#### Measurement Considerations

If the concept of motivation to participate is ever to be successfully captured for recreation planning/management purposes, it must be carefully separated from the modes of expression. A key is to make the distinction between the initiation of behaviors (motivation) and the expression of that behavior (learned mode).

Such a process might occur in a two-step fashion. First, it would be necessary to identify critical outcomes. Recognizing the generality of the different levels of decisions about participation described previously, it would be necessary to identify which would discriminate individual choices for engaging in certain activities in specific settings. The combination of such critical outcomes with key antecedent variables (experience, lifestyle) should predict a given mode of expression.



The mode of expression would then be tied to states that people are trying to attain in order to describe the standing pattern of behavior. These variables represent the experience opportunity setting characteristics of recreation by representing social forces in the physical setting. The question then is how to describe such a concept.

We believe that one way to help the process is to develop an expanded conception of the dimensions required to inventory learned modes of expression. Since we wish to discriminate this concept from the traditional motive measure, we need to focus more directly on the link between behavior and environment. Our earlier arguments that people respond to environments at the broad level of organization as settings as opposed to the specific attributes present suggests that such indicators should accordingly be more holistically descriptive.

In this sense, the primitive-urban continuum proposed in ROS is a useful dimension. It is but one dimension, however, and the identification of alternate predictors of important differences in mode of expression is a challenge yet to be unravelled by research. Nevertheless, we might find that the process-oriented inquiry examining the subjective states of leisure is already offering some clues. The key is to identify dimensions of human activity that represent contrasting modes of expression, which ultimately would affect the capacity to attain a desired state. Continuums such as active/passive, social/solitary, experiential/informational, arousal-seeking/arousal-reducing, and comfort/asceticism are potential candidates for research.

## CONCLUSIONS

What we have presented here is inherently frustrating because it adds another layer of complexity to an already complex situation. Further, it has disturbing implications for the applied efforts to inventory recreation resources for planning and management purposes. We are talking about defining recreation settings in terms of appropriate modes of behavior and social settings rather than in terms of physical features. This does not lead to easy application, and renders physical inventory of extremely limited utility.

We are essentially offering another means of organizing a body of concepts about outdoor recreation behavior. We do not intend to invalidate the traditional conceptions, as much as to put them in a different context. We recognize that virtually everything we have offered is conjecture. Our motives are to stimulate more systematic and directed debate concerning which organization of reality is the most useful for the purposes to which these inquiries are ultimately to be put. In so doing, we hope that this mode of expression of those motives will allow us to attain the desired level of consciousness!

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## SUBSTITUTION IN RECREATION CHOICE BEHAVIOR

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**ABSTRACT:** This review discusses concepts and theories of substitution in recreation choice. It brings together the literature of recreation research, psychology, geography, economics, and transportation. Parallel and complementary developments need integration into an improved theory of substitution. Recreation decision behavior is characterized as a nested or sequential choice process. Examples are included from urban and dispersed recreation research.

### INTRODUCTION

Recreation resource management is dependent on understanding recreation choice behavior. Many management actions directly affect the attributes of recreation sites, e.g., changes in services and facilities, modification of site quality or capacity, changes in user fees, and congestion management. Such changes may strongly modify the quantity and types of recreation participation in general as well as at specific sites. If management actions are to be efficient and effective, the resulting effects on recreation choice need to be predictable.

How recreationists respond to management actions depends largely on two factors: (1) the underlying preferences of consumers as constrained by their resources, and (2) the available alternatives. If a new campground is established in an area where there are several similar campgrounds, the changes in behavior will be driven largely by reductions in travel cost. The new campground can be expected to intercept those campers for whom it has a lower travel cost, thereby reducing visits at more distant sites.

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And, because of the lower cost, it may generate increased camping activity. This increase in camping may draw people away from other activities, such as gardening or television watching.

If the new campground also differs from all the others by providing hot showers, still more behavioral change can be expected. The location factor is a price change while the hot showers are a site quality change. There may be people who now drive farther than before in order to have a camping experience that includes a hot shower. And, the availability of showers may attract new campers. Unless we understand how individuals evaluate and choose among recreation opportunities, serious errors may be made in predicting how they will respond to management actions.

The theoretical framework for making such predictions has not been adequately developed and applied. One of the most difficult and least understood parts of this problem is the question of how people tradeoff activities, sites, and site attributes when change is encountered. This paper discusses this concept of "substitution" in recreation choice behavior and exposes some common problems. Theories of choice behavior from several disciplines are reviewed and their implications discussed. Some recent research results from urban and dispersed recreation provide examples.

The concern here is with substitution as it pertains to modeling choice behavior. People make choices in decision situations, and the purpose of a choice model is to allow such choices to be predicted and analyzed. A choice model might be formulated at any of several levels of the choice process. People make choices among recreation sites, among attributes of those sites, among activities that might take place at the sites, and among the consequences or outcomes of performing alternative activities at alternative sites. These consequences include the satisfaction of motives or expectations that may or may not be in the recipient's domain of awareness.

While there are many important reasons for explaining recreation choices at all of these levels, our purpose is to explore substitution among sites and site attributes in models based on observations of overt choice behavior. What goes on inside the mind and body of the consumer is left for others to explore.

## WHAT IS "SUBSTITUTION"?

Webster defines "substitution" as, "to put in the place of." Within this concept, substitution can be defined at different levels. At the simplest level, two objects that are physically identical in every respect are likely to be substitutable for each other. Thus, physical similarity is one way to attack the question. At a more general level, substitution may derive from functional similarity. Two physically dissimilar objects may be capable of performing the same function. One object can be put in the place of another and perform similar functions, e.g., pen for pencil.

Whether or not two objects are substitutes can be learned by observing behavioral response to changing opportunities. A simplistic approach would hold that, other things being equal, if the consumption of A goes up when the price of B goes up, the two are substitutes; if the reverse is true, they are complements. If nothing happens to A when the price of B changes, they are independent.

The trouble with this approach is that it reveals only what is known already. It is not possible to predict choices under new circumstances, (i.e., to predict behavioral response to innovation). Neither is it possible to recognize when apparent substitutability is simply the product of spurious correlation. What is needed is a theory of choice behavior that explains choices in terms of those variables to which they are sensitive. Lancaster (1966) and Becker (1965) responded with a new consumer theory based on the concept that the objects of choice are not the goods themselves, but the attributes possessed by those goods. Consumers use the attributes as input factors for a consumption technology that produces utility. For example, they combine time, travel, equipment, facilities, and the features of natural environments to produce outdoor experiences such as camping.

The attributes may be thought of as parameters describing the physical state of a thing. Thus, an automobile can be described in terms of color, make, model, rate of fuel consumption, braking distance, luxury options, etc. In this sense, substitution again reduces to physical similarity, except that in a given decision context only selected physical attributes may be relevant. Substitution is thus physical similarity vis-a-vis only those variables relevant to the decision context. On the other hand, as expressed by Morishima (1959), demand is created by human objectives. Goods are demanded because of their ability to serve human purposes. Certain attributes or context variables may modify the effectiveness of a thing in a given role. Substitution can occur among purposes, among attributes, or among goods, and this complicates matters.

It becomes still more complicated when we allow decision rules to vary. Some goods,

attributes, or purposes may be compensatory, others noncompensatory. Some noncompensatory decisions may involve lexicographic decision rules. For example, for aerobic conditioning, jogging and bicycling are generally regarded as compensatory activities. More bicycling can compensate for less jogging in the maintenance of aerobic capacity when a minor injury interrupts a runner's training schedule. However, more carbohydrate in the diet cannot compensate for iron deficiency. The two nutrients have independent functions and are noncompensatory. A lexicographic decision rule requires criteria to be satisfied in sequential or hierarchical order. In shopping for formal wear, a conventional male goes first to the men's department and then compares alternatives. He does not compare evening gowns and tuxedos. There may also be threshold decision rules such that in a given range the relationship among attributes is lexicographic, while in another range the attributes are compensatory (Peterson and Worrall 1970, de Bettencourt and Peterson 1981, Krumpal and McLaughlin 1982).

Whatever the decision rules, it is clear that they must be known and understood if prediction of substitution in recreation choice behavior is to be effective. A given model structure may be entirely inappropriate in a given decision context. What is needed is a theory of recreation choice behavior and interpretation of real choice situations in terms of that theory. Therefore, the next section reviews the approaches of several different disciplines.

## REVIEW OF SUBSTITUTION RESEARCH

While there is a great deal of research related to substitution, only a small portion of this research confronts the substitution issue directly. First, the treatment of substitution in empirical studies within recreation will be reviewed, and then, briefly, more basic research from geography, psychology, transportation, and economics. The latter provide some of the pieces for a much needed conceptual and theoretical basis for substitution research within recreation and leisure. We will not at this stage attempt to assemble the pieces, but hope to begin to identify the components of a more comprehensive model in which substitution may be addressed.

### Recreation Research on Substitution

There are two major bodies of substitution research within recreation: (1) recreation/leisure activity substitution, and (2) recreation site substitution. The former has largely been the domain of sociologists and psychologists while the latter has been addressed by geographers and economists. A few studies examine substitution between resource settings (O'Leary and Dottavio 1981), geographic areas (Dutton and others 1975, Vaske and Donnelly 1982), and providers (Cordell 1976).

Hendee and Burdge (1974) raised the importance of the substitution concept for recreation planning and management in the context of recreation activity substitution. Growing out of the leisure typology research was an attempt by a number of investigators to shed light on substitution relationships by factor analyzing recreation participation data. Recreation activities were grouped into activity types with the idea that activities within the same group are in some sense "substitutable." Planners could then meet the recreation needs of clientele groups by providing at least several activities from each group, rather than attempting to provide all activities. Beaman (1975) pointed out the inappropriateness of factor analysis for deriving activity packages, recommending cluster analysis as the more suitable tool. Because the activity packages derived through factor analytic methods are based upon correlations between participation in different activities, activities falling in the same cluster are just as likely to be complements as substitutes. Christiansen and Yoesting (1977) tested whether recreationists would derive similar "satisfactions" from activities within the same type category, concluding that the approach of deriving activity packages empirically is too simplistic to yield much insight into substitution behavior.

A more productive approach to activity substitution is the development of recreation activity packages based upon similarity judgments of real or perceived characteristics of recreation activities. Ritchie (1975) and Becker (1976) have used multidimensional scaling techniques (MDS) for this purpose. Holbrook (1980) recommends the method of multidimensionally scaled correlations (MSC) as preferable to both factor analysis and MDS in representing association among recreation activities. MSC performs an MDS procedure on the correlation matrix of variables rather than the variables themselves. A limitation of MDS, MSC, and related attitude scaling methods for substitution research is the problem of linking attitudes with behavior. Becker (1976) notes that situational variables must be studied in conjunction with attitudinal data in order to predict actual behavior.

The problem of how to incorporate the effects of substitute sites is common to both economic demand models and geographic models of spatial choice. Investigators from both disciplines tend to favor revealed preference approaches in which a variety of situational factors must be controlled. Motivational and attitudinal variables that are difficult to observe are downplayed, and observable characteristics of recreationists, recreation sites, and selected environmental variables are studied.

Measures of recreation site substitution have been incorporated into aggregate recreation demand and trip distribution models. The travel cost model (Dwyer and others 1977, Rosenthal and others 1984) and the gravity model (Ewing 1980) have been the primary vehicles for examining substitution in recreation economics and geography, respectively. To predict the number of trips or visits to a set

of destinations, those gravity models that include a substitute component typically capture it by means of a single variable measuring the quantity and/or quality of alternative recreation opportunities available from each origin. The selection of sites to be included as potential substitutes and the measurement of their characteristics is most often done by the investigator, rather than the consumers whose choices are to be predicted. Many of these studies limit the range of substitutes to sites managed by the same authority or sites that are similar according to some criteria defined by the investigator. Thus, television viewing is never considered a substitute to visiting a given state park, and in many cases neither is visiting a county or urban park. When studying state parks, only other state parks are likely to be considered. Park visitation models that include a substitution component are those of Grubb and Goodwin (1968), Cheung (1972), Cesario (1973), and Smith (1980).

The substitution issue has also been prominent in the development of travel cost models, which are widely used to estimate the demand for and value of recreation sites. Such models can yield very misleading results if substitute sites are not properly specified. This is well illustrated by Knetsch (1977). Good examples of alternative ways of incorporating substitutes into recreation demand models are the studies of Burt and Brewer (1971) and Cesario and Knetsch (1976). Both studies estimate the demand for individual parks within a system of equations, taking into account the presence and attributes of alternative sites in estimating the demand for any particular site.

Because both the gravity and travel cost models have traditionally been applied to aggregate data, they can only reveal aggregate patterns of substitution. In order to shed more light on individual differences in recreation choices, recent work in geography, economics, and transportation has explored disaggregate modeling of choices. These models can be applied to both activity and site choice problems, provide a stronger theoretical base for aggregate models, and can more fully incorporate a variety of assumptions about substitution. Since these new directions in choice research are not well known within recreation, we first provide a brief background on the development of choice models in psychology and then discuss some recent development in geography, economics, and transportation.

In summary, while sociologists and psychologists have concentrated on motivational and attitudinal determinants of choice, geographers and economists have focused more upon situational factors. However, their studies have examined substitution in the context of site choice, not activity choice, and no one has really attempted to link these two somewhat independent bodies of research.

Psychological choice research focuses upon individual choice and relies heavily upon experimental methods. A strength of the psychological research is the reduction of choice to fundamental concepts and relationships, resulting in tight controls in research designs. A corresponding weakness is that to achieve rigid experimental controls the conditions and settings are often oversimplified and sometimes artificial. This makes it difficult to generalize the results to highly complex real-world settings.

The relevant psychological research may be divided into two classes: (1) mathematical models of choice that establish set-theoretic foundations for applied work, and (2) more applied research, which explores choice in terms of individual perceptions, preferences, and information processing. The latter category overlaps considerably with the microlevel geographic research, but tends to have a stronger methodological orientation.

Along with psychophysics and learning, choice is one of the three primary subject areas within mathematical psychology. The models of Luce (1959) and Tversky (1972a, 1972b) have guided much of the theoretical choice research over the past two decades and provide the foundations for the majority of applied studies of choice. Both are highly abstract theories couched in purely set-theoretic terms.

Luce's model formalizes Arrow's (1951) "independence of irrelevant alternatives" (IIA) assumption into a choice axiom. Because it relates to recreation choice modeling, this axiom is discussed and illustrated in a subsequent section. This powerful and simplifying assumption makes the Luce model easy to apply, although it is known to fail in many simple kinds of choices (DeBreu 1960) because of interrelationships among choice alternatives that are not captured in the highly abstract model. Nevertheless, the Luce model provides a reasonable approximation for many kinds of choices (Luce 1977) and, perhaps more importantly, provides a starting point for choice research including substitution phenomena. The Luce model has been shown to be essentially equivalent to Thurstone's (1927) Law of Comparative Judgement (Case V) if Thurstone's assumption of independent, normally distributed random variables is replaced by double exponential, random disturbances (Yellott 1977, McFadden 1973). The difference distribution of two independent double exponential random variables is the logistic distribution, which is the basis for the multinomial logit model (MNL) (Stynes and Peterson 1984). Thus, there is a direct link between the widely applied MNL model and basic theories of choice studied by Luce, Thurstone, and others. The simple counterexamples to the Luce model (DeBreu 1960, Luce 1977, Tversky 1972a) are also cases where the MNL model will fail. These cases have provided the stimulus and direction for revised choice theories that more fully capture interrelationships among the choice objects. Most notable of these within psychology

is the Tversky (1972a, 1972b) elimination by aspects (EBA) model.

Although the EBA model, like Luce's, can be formulated in purely abstract set-theoretic terms, the natural interpretation of the model involves the identification of the choice alternatives in terms of a set of attributes or characteristics. Luce's model is a special case in which the alternatives do not have any characteristics in common. The EBA model is lexicographic. A choice is made from a set of alternatives by successively eliminating those that do not possess desired attributes. There is an assumption that individuals have a ranking of desired attributes and eliminate alternatives beginning with the most desired attribute, then the second most desired attribute, etc., until only a single alternative (the choice) remains. The model is noncompensatory because a lack of one desired attribute cannot be compensated by another. Any alternative lacking the most desired attribute is eliminated in the first step regardless of what other desirable attributes it may possess. The EBA model results in nested or sequential decision structures that can become combinatorially complex when the alternatives possess many different attributes (Krumpe and McLaughlin 1982). Indow (1975) questions whether any mathematical model can fully capture the complexity of individual choice processes, suggesting computer simulation as an alternative approach. Grether and Plott (1979) have found that individual behavior is often at odds with what is implied by the formal, and fairly mathematical, theory of consumer demand in economics.

The strength of the formal mathematical treatment of choice lies in the precision with which concepts can be defined and the manner in which properties may be deduced and tested (See Luce and Suppes 1965, Tversky and Russo 1969). In the absence of such approaches, the essential differences and similarities between alternative choice models, like the Thurstone and Luce models, would remain obscure. By employing a common mathematical language, the theories of choice behavior from psychology and economics can be shown to share common foundations. This helps a great deal to clarify the properties and limits of these models, including the implied assumptions about substitution.

Applied studies of preference, utility, and choice within psychology look more closely at the choice set, choice setting, and attributes of the choice alternatives in order to explore individual differences and common patterns of choice behavior. Many of these studies attempt to identify a utility function, and model choices as a utility maximizing process. The methods are variously known as information integration, functional measurement, conjoint analysis, and policy capturing. These kinds of methods are widely applied in geography, marketing, economics, transportation, and related fields. The psychological contributions to this area have identified a number of methodological issues that must be considered in the design of choice experiments. For example, Tversky's (1977) review



of the concept of similarity presents both theoretical and empirical evidence against representing similarities between objects or choice alternatives geometrically. This is precisely what the MDS and related methods do. Tversky suggests that similarity judgments are the result of a feature matching process and may not satisfy the metric assumptions of symmetry and transitivity. Curry and others (1983), in an application to recreation, conclude that a number of contextual and measurement issues can significantly influence the results of choice experiments, making it difficult to generalize from one choice setting to another. These problems may explain many of the apparently conflicting results of choice experiments as well as the difficulty of generalizing from highly artificial settings to real-world choices.

## Geography

Geographic choice research focuses upon spatial choice and is therefore relevant to the recreation site choice problem. Geographic measures of substitute and intervening opportunities provided the basis for numerous recreation applications of the gravity and related trip distribution models. At the macrolevel, geographers have become increasingly concerned with the effects of spatial structure on the parameter estimates of gravity models (Fotheringham 1981). Spatial structure of alternative sites cannot be adequately represented by a single variable, and models incorporating spatial structure more fully are being sought. At the microlevel, there have been numerous efforts within geography to better explain spatial choice by examining data for individuals. These investigations have added cognitive dimensions to gravity models (Cadwallader 1981) and explored individual variations in perceptions of distance and alternatives. Much of this work overlaps with work in marketing and psychology on functional measurement, information integration, and the like (see Golledge and Rushton 1976 and Burnett 1981, for examples).

## Economics

Economics is the study of the employment and consumption of scarce resources that may have alternative uses (Samuelson 1976). Two questions addressed are (1) how factors of production (e.g., land, labor, capital) should be allocated to firms, and (2) how the goods produced by firms should be distributed to consumers. Substitution in recreation choice is a matter of consumer behavior, so the relevant contribution of economics is the theory of consumer demand, which also has a similar development in the theory of the firm. The economic point of view assumes that prices are the key mechanism regulating the consumer's and firm's allocation of scarce resources.

The theory is well known and is only summarized here. A full exposition is available in, for example, Henderson and Quandt (1980). The

amount of a given good consumed by a person is a function of tastes and preferences, prices of that good and of other goods, and income. The consumer's preferences among choice options are assumed to be describable by an ordinal utility function that has certain restrictive properties. Income and prices are generally assumed to be fixed. Faced with a choice among several competing alternatives, the consumer is assumed to pick that option which maximizes utility, subject to a budget constraint. The result of this utility maximization is the individual demand function. This function describes for that person the relationship between the quantities of goods consumed and their prices. The aggregate or market demand function is the sum of individual demand functions. To attain more effective treatment of substitution and complementarity, consumer theory has been extended by Morishima (1959) and Lancaster (1966).

The theory of consumer demand provides a disciplined framework for the treatment of substitution. The price elasticity of demand gives the percent change in demand for a good (or attribute) resulting from (1) a 1% change in the price of that good (attribute), or (2) a 1% change in the price of some other good (attribute). The price elasticity of demand is dependent on prices and marginal rates of substitution. The marginal rate of substitution (MRS) is defined by the utility function. It is the amount of good Y the consumer is willing to give up to attain one more unit of good X. Two goods are perfect substitutes if the MRS is constant, no matter how much X or Y is owned. The price of a good is determined by the quantity available and the quantity demanded.

When trying to predict demand or estimate value for a recreation activity or site, it is important to assess the availability of substitutes. The demand function is the basis for predicting participation and estimating benefits under alternative management options. Failure to incorporate the effect of substitutes in the demand function can produce incorrect results. For example, assume the managers of a certain recreation site want to raise entrance fees, but are unaware that a perfect substitute with excess capacity is available a short distance away. Raising the fee will simply divert to the alternative site those users whose added travel cost is less than the price increase.

A decision not to close the site may be similarly misguided. Estimates of the net benefits to the public of a government-operated site will be too high if an uncongested nearby substitute is ignored. Assume that closing the site will require all users to travel one mile farther up the canyon. The loss of benefit caused by the closure is only the cost of the added one mile of travel. Of course, if the second site has insufficient capacity, there will be a loss of quality and/or an increase in price that will affect the outcome of the closure.

Thus, the demand for a recreation site or activity is a function of its price plus the prices of all other goods and services in the

economy. If demand and substitution are to be tractable in this overwhelmingly complex framework, some simplification is required. Complex demand functions can be accurately represented through the use of "flexible functional forms" (Simmons and Weiserbs 1979). The demand functions themselves can be simplified through assumptions about separability in the utility function (Barten 1977, Powell 1974). If the utility function is weakly separable, all goods can be partitioned into a set of mutually exclusive subgroups such that the MRS between two goods within a group is independent of the quantity consumed (and price) of any good in another subgroup, holding utility constant. This allows consumer decisions to be structured in terms of a nested utility tree (Deaton and Muellbauer 1980), which in turn enables the estimation of conditional demand functions.

What this means is that consumer decisions can be viewed as sequential (Katzner 1970). At one level, the consumer decides how much income to allocate to each of several groups of goods. Given the allocation of income, say, to a group of recreation sites, choices among those sites are independent of choices among goods in other groups. If the partial utility function describing how preferences are ordered within the group is homothetic (Silberberg 1978, p. 254), then proportional allocations of income among goods within the group are also independent of the amount of income allocated to the group. This framework leads to a nested conditional choice structure that includes as special cases the EBA model and the sequential model of Kruppe and McLaughlin (1982).

Such assumptions and conditions greatly simplify the analysis of recreation choice behavior. Unfortunately, these assumptions are too often hidden and unrecognized. These hidden assumptions describe the world to which the model applies. The important question is how far that world is from the real one. This line of economic reasoning reveals the kinds of questions that should be asked when various types of models are used. It also provides a framework for defining and answering questions about substitution. When we decide to consider only a finite set of substitutes in a model, say a group of state parks, we have made a strong implicit assumption about the underlying choice process. Would it not be better, through research, to discover the structure of the choice process, and then to ask what kinds of models and sets of substitutes are implied thereby? This discovery of the underlying choice processes is the objective of relevant research in psychology, geography, and recreation. Integration of this work within the organized framework of economics would be a major contribution. Progress is hampered by a lack of the data needed to verify and interrelate the theoretical propositions.

#### Transportation

Transportation researchers appear to be at the forefront of applied choice modelling. Most

of the work has centered around mode choice and the multinomial logit model or variations thereof. Transportation researchers seem to have been successful in integrating economic, geographic, and psychological variables into formal choice models that can be empirically estimated and tested. Domencich and McFadden (1975) and Stopher and Meyburg (1975) derive the MNL model in the transportation context based upon utility maximization. Much of the recent work in transportation addresses some of the undesirable properties of this model, including assumptions about substitution. This has led to a variety of models with different assumptions about substitution, including nested logit models, probit models, and generalized extreme value models (Chu 1981, Amemiya 1981).

A recent book by Anas (1982) provides a framework for the estimation of conditional demand functions, based on a nested or sequential decision process, as derived from assumptions of separability in the utility function. His approach provides the analytical framework for treatment of substitution in conditional and nested choice models. These models have the advantage of beginning with assumptions about individuals and then generating aggregate results by combining the individual choice models under various distributional and separability assumptions. In this way they can capture the common features of individual decisionmaking processes without attempting to "predict" individual behavior. Recent research has explored interpersonal variations in the choice set (Richardson 1982), and the effects of a number of possible misspecification problems on travel demand forecasting (Williams and Ortuzar 1982). The MNL model has been applied to recreation by Stopher and Ergun (1979, 1982), Peterson and others (1982), and Peterson and others (1983). Stynes and Peterson (1984) provide a general review of logit models, drawing conclusions for applications to recreation choices. They, as does Vickerman (1978), specifically discuss the independence of irrelevant alternatives (IIA) property of the MNL model in the recreation context.

#### CHOICE MODELING AND NESTED CHOICE STRUCTURE

The demand models typically used in recreation are general share models. They exhibit the IIA property and imply strict assumptions about separability in the utility function. This means, in general, that adding or deleting an option will not change the proportional shares of demand to the other alternatives. For example, let two existing parks, A and B, each receive 50 percent of park use. The IIA property implies that adding a third park, C, might reduce total participation at A and B, but the proportional allocation between A and B will not change. Both will continue to receive half of the participation allocated to A and B. Clearly, this is reasonable in some situations and not in others. The key to proper choice modeling is an understanding of choice structure, including the separability and form of the utility function and the implications for substitution.

The typical example used to illustrate the IIA problem comes from mode choice analysis in transportation planning. The object is to predict how travelers between two locations allocate themselves among automobile, bus, and rapid transit as a function of the characteristics of the three modes. Assume an appropriate general share model (such as a logit model) has been developed, based on observed choice behavior. Assume also that all the buses are red. Now, the planning authority decides to paint half the buses blue and wants to predict the new distribution of riders. The analyst assumes that red buses compete with blue buses in the same way that buses compete with autos and rapid transit. If, before the painting, the three modes each received one-third of the use, the model will allocate one-fourth of the use to each mode after the painting. If the riders are indifferent to color, or less concerned about color than about other things, they will continue to allocate one-third to buses. The new situation will be 1/3 to autos, 1/3 to rapid transit, 1/6 to red buses and 1/6 to blue buses, while the model predicts 1/4 to each.

The mistake arises because the analyst fails to understand the role of color in mode substitution. Red buses and blue buses were seen by the riders as perfect substitutes but were assumed by the analyst to be imperfect substitutes at the same level as buses versus autos. Technically speaking, this problem is caused by lack of independence among the random elements of utility. When some alternatives are more similar than others, the random elements will be correlated and the IIA assumption will be violated. The trouble is, it is practically impossible in recreation applications to correctly identify sets of balanced substitutes without much more theory and information than now available.

Other conditions also cause problems. Different sites may attract different mixes of activity and different mixes of preference for site attributes. Mixing these processes violates the IIA assumption, because the parameters and perhaps even the specification in a model will change for different subsets of a given set of alternative sites. The solution is to isolate the separate components of the mixed process.

In the mode choice example the analyst saw the situation as figure 1, in which riders face four substitutable alternatives. However, the riders saw it as figure 2, in which they face, at one level of choice, three competing alternatives. Given that bus is chosen, a new level of choice is confronted: red or blue. The preferences to which the red versus blue choice relates are different than the preferences that govern, in this case, choice of travel mode. The two sets of preferences may or may not differ in relative importance. In the example, color was assumed to be unimportant to mode choice. In any case, a different utility process applies to the choice of mode than applies to the choice of color. The decisions need to be separated, because while bus substitutes for auto and transit, blue does not.

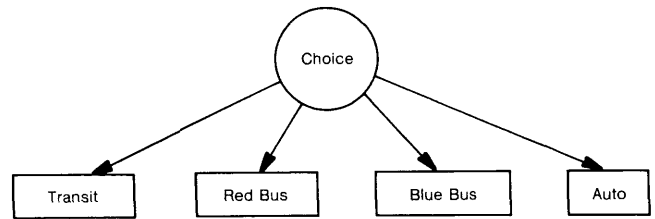


Figure 1.--The Red Bus - Blue Bus problem as a simultaneous choice.

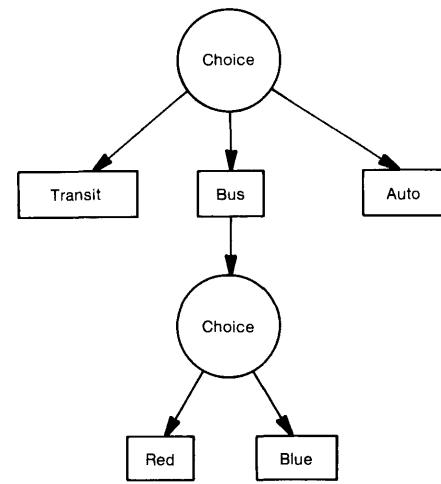


Figure 2.--The Red Bus - Blue Bus problem as a nested choice.

In the extreme case, preferences might be hierarchical. Choices, choice sets, and substitution would have to be nested in terms of the hierarchy of objectives. For example, people have objectives that relate to comfort, convenience, and esthetics, in choice of transportation mode. They also have objectives that relate to cost, safety, and access to desired destination. A mode that does not serve the destination is not acceptable, no matter how cheap or pretty it may be. Given two modes that serve the destination, choice will probably be influenced by significant differences in safety. An abnormally high risk of being killed or injured cannot be compensated by differences in cost, comfort, convenience, esthetics, etc. This approach leads to a nested conditional model of recreation choice behavior that might take the sequential form proposed by Krumpke and McLaughlin (1982).

Figure 3 illustrates a hypothetical (and highly simplified) recreation choice process. The objective of the analyst is to predict participation in fishing at five different sites. Two of the sites (3 and 4) are restricted to fly fishing only, while the other three (1, 2 and 5) are unrestricted. Use of an IIA general share model, which treats all five sites as substitutes, suffers from the "red bus-blue bus" disease.

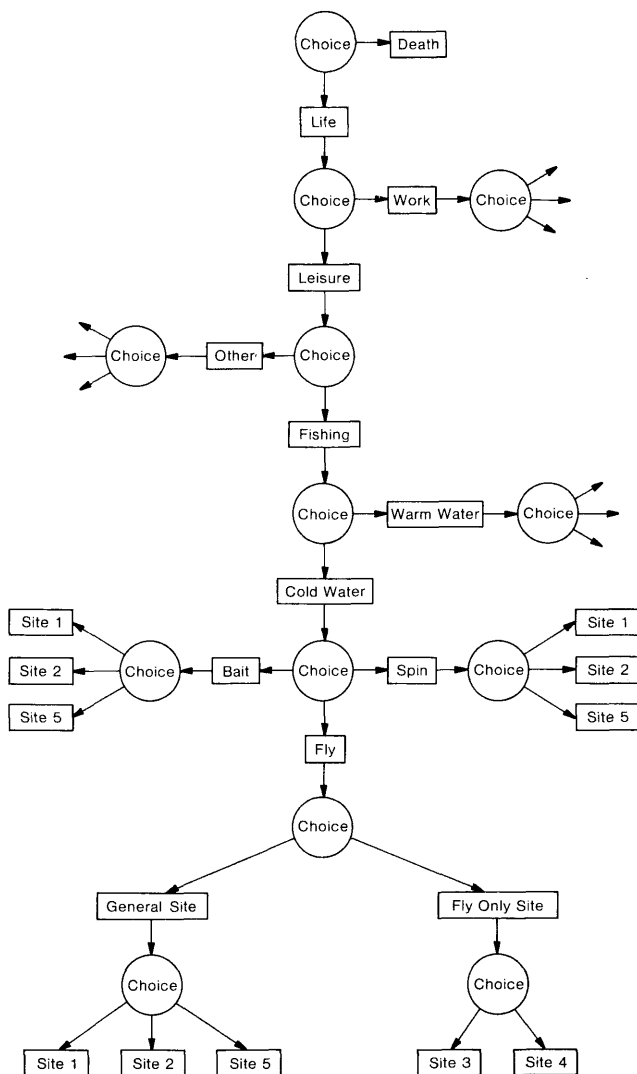


Figure 3.--A nested fishing site choice example.

Different fishing methods (e.g. fly fishing) involve different site choice rules, because the requirements of the methods and the objectives of the fishermen differ. Effective modeling requires exposure of the nested conditional structure in the choice process. It is then necessary to stratify models and population subgroups in terms of that structure. On face value it is the same old problem of "interaction" commonly encountered in social and behavioral research (Sonquist 1970). In terms of economic theory, it arises in recreation choice behavior because of 1) conditions of separability in the individual utility function, 2) differences among individual utility functions, and 3) similarities and differences among the choice options.

Using a general share model to predict demand for a proposed new fly-only site (site 6) would violate the IIA assumption because of mixed processes and mixed levels. Site 6 competes with

sites 1, 2, and 5 only for people who have decided on fly fishing. Sites 3, 4 and 6 compete, given that the choice is to go to a fly-only site. Fly fishing competes with bait and spin fishing at a different level. The problem is corrected in part by stratifying by fly fishermen, but fly fishermen who select a fly-only site may follow a different utility process, given this choice, than those who go to a general site. The problem is ultimately solved only by modeling each decision level conditional on the outcome of the higher level. It is noteworthy that an early concern with this type of problem is implicit in the Burt and Brewer Model (1971). They classified their sites into subgroups of perfect substitutes with imperfect substitution among subgroups.

#### Direct Evidence From Site Choice Modeling in Urban Forest Recreation

In a recent study, Peterson and others (1983) found the IIA property to be violated in an application of an MNL model to urban forest recreation site choice. The choice set contained 21 sites in the Chicago metropolitan area, including two indoor conservatories, a large arboretum, a large botanical garden, and 17 forest preserve areas. Variables used in the model were travel distance (price) and four perceived site attributes: stimulating-educational, quiet, safe, and forested. When the model was estimated for different subsets of the 21 sites, the distance coefficient was found to be quite stable. Coefficients for the perceived site attributes fluctuated considerably, however, with those for "quiet" and "forested" actually varying in sign. This is prima facie evidence of violation of the IIA property, and plausible causes were discussed. Apparently, the specified choice set contained sites that represented different levels in a nested choice process. Consequently, different sites tended to attract people with different purposes. While the model presumed these sites to obey specific substitution rules, they clearly did not.

Subsequently Lin (1983) used the same data to estimate a nested choice model. Based on the perceived attribute scores, Lin used cluster analysis to partition the 21 sites into three groups. Within a group the sites were perceived as more similar than among the groups. It is not surprising that the arboretum and botanical garden formed one group, the conservatories formed a second group, and the forest preserves made up the third group. These groups were then used to set up a nested choice process as in figure 4. At the first decision level, the consumer faces a choice among conservatory, botanical garden, or forest preserve. These represent different activity types, perhaps selected to satisfy different objectives. At the second level the alternatives depend on the outcome of the first.

In the earlier study, Peterson and others used a simultaneous choice model that forced substitution across those hypothetical decision levels. When the mix was changed, the model had to change. Lin used tests developed by McFadden and others (1976) to reject the hypothesis that

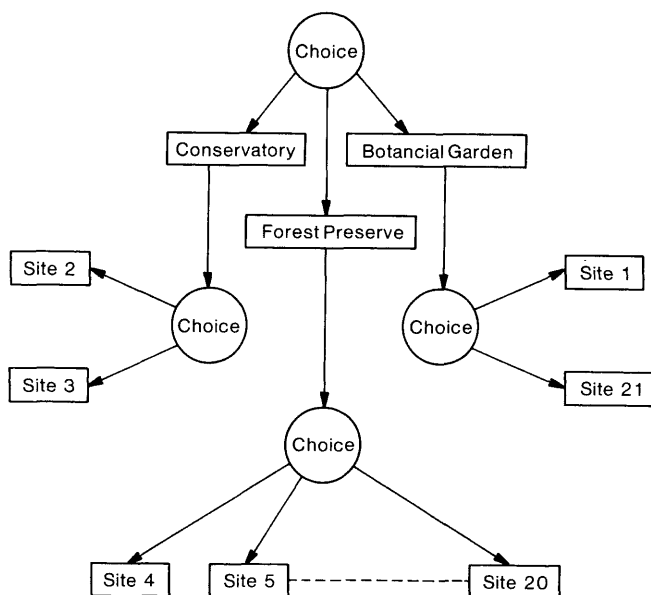


Figure 4.--Lin's nested urban recreation site choice model.

the 21 alternatives obey the IIA property required by the simultaneous choice model. He then estimated the nested logit choice model with the structure illustrated in figure 4. The explanatory power was improved significantly and the meaning of the model was improved. Within the conditional groups, the IIA property was obeyed. Between the groups, different but meaningful choice processes were seen to be operating.

#### Indirect Evidence From a Wilderness Site Demand Model

In an earlier study, Peterson and others (1982) developed a site-demand model for the Boundary Waters Canoe Area Wilderness (BWCAW). The model was stratified by 12 types of use occurring in the same wilderness. The data consisted of a census of trips for the period 1974 through 1977. No attempt was made to include substitute sites for any of the 12 types of use. The model simply distributes trips among origins under the assumption of no substitutes.

The distance elasticity of demand (percent change in demand percent change in distance) was found to differ by type of use. These differences demonstrate that different demand processes are at work among the different types of use. The different user groups have different objectives, their on-site activities have different input requirements, and they face different sets of substitute sites. Therefore, they respond differently to travel cost and, by implication, to on-site attributes.

In this paper we have attempted to expose and motivate interest in a major problem in recreation choice, that of substitution in recreation choice behavior. It is an important question in many aspects of recreation resource management and research, yet it is poorly understood. Toward correction of this inadequacy, we have tried to define the question and review various lines of research that seem to be converging on it, albeit from different points of view and with different languages. Finally, drawing on this research, we have framed the substitution problems in terms of nested choice structure, which we illustrate with hypothetical and empirical examples.

The problem of substitution is still far from resolved. Questions arise which point directions for much-needed future research. One important need is for researchers and managers to recognize that the decisions they make about model specifications and substitute sets in demand and participation analyses carry some important implied assumptions about choice behavior. These assumptions should be exposed and challenged.

A second important need is for better integration of the related concepts of several disciplines into a theory of recreation choice. Well-developed bodies of literature in psychology, geography, economics, and transportation, for example, provide the basis for a powerful theoretical framework. Once integrated, such a framework needs to be made operational in terms of practical models and research methods. Further, the concepts need to be turned into facts about recreation choice behavior. What are the nesting structures that describe the actual choice processes of different types of people in recreation choice situations? What decision rules do they follow? What are the practical choice sets that are considered when decisions are made? Are these ad hoc questions that must be encountered in every practical or research problem or can empirical research be generalized into useful rules and principles?

Depending on the objectives, still more work may be needed in explaining the decision processes thus revealed. Are we satisfied with the descriptive approach of revealed preference, or is there a need to delve into motivational factors that lie behind and are the object of recreation choice? The work of Morishima (1959), Lancaster (1966), and Becker (1965) presents an interesting extension of the powerful and well-developed theory of economics, which seems to be reaching toward behavioral research in the psychology of recreation choice.

At first glance there appears to be lack of consensus among researchers from different disciplines on the merits of further emphasis on these behavioral aspects. For estimation of demand, the benefits at least include exposure of the assumptions implied by various demand specifications. In general, though, the question should be asked in the context of the purpose to be served. Different purposes require different

kinds of information. The information needed to answer questions asked by economists, for example, may be different than is needed to satisfy designers or planners. Indeed, this may be an example of the most serious obstacles to multi-disciplinary integration of a theory of substitution in recreation choice. Different disciplines, different studies, and different applied contexts seem to be answering mixtures of different questions which have not been asked clearly or adequately separated. One of the most needed contributions may simply be to identify the different questions being stirred in the research pot, the applied contexts from which they derive, and the kinds of answers they require.

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## A DEVELOPMENTAL MODEL OF RECREATION CHOICE BEHAVIOR

Daniel R. Williams

**ABSTRACT:** Recreation choices are viewed as including, at least implicitly, a selection of an activity, a setting, and a set of companions. With development these three elements become increasingly differentiated from one another. The model is tested by examining the perceived similarities among a set of 15 recreation choices depicted in color slides.

### DEVELOPMENTAL PERSPECTIVES

The subject of how recreationists choose leisure settings or activities has received increasing attention among researchers and managers as made obvious by these proceedings. Drawing on behavioral decision theories, much of this work has been directed at describing how a specific recreation choice is made using various cognitive models. The developmental perspective on choice taken in this paper turns the focus away from describing how individual decisions are made to searching out patterns of choice and the process by which people develop and become specialized in their leisure pursuits.

Calling for a cognitive developmental theory of leisure and work, Blocher and Siegal (1981:42) describe the dynamics of leisure development: "As individuals move into higher cognitive levels, the meaning of leisure activities may change.... as people grow cognitively they are attracted to stimuli (recreation settings and activities) that involve higher and higher degrees of novelty, complexity, ambiguity, and abstraction." Thus, with cognitive development comes a gradual change in the expression of choice. This paper explores how such growth comes about and what influence it has on subsequent recreation choices and preferences. A developmental model of recreation choice will be described.

The concept of leisure or recreation development has been explored in various contexts including studies of socialization (Kelly 1977), comparisons of pre- and post-retirement leisure patterns (Yuskaitis 1981), discussions of leisure and family life cycles (Parker 1979), and analysis of play behavior (Levy 1978). In outdoor recreation research, developmental perspectives have taken three forms. One emphasizes the influence of previous use or participation on perceptions, preferences, and attitudes (Schreyer and others

1984, Hammitt and McDonald 1983). The second, recreation specialization, assigns developmental levels based on the participant's involvement in and commitment to a leisure pursuit as indicated by participation, monetary investment, and impact of the activity on the participant's lifestyle (Bryan 1977; Wellman and others 1982). The third form examines socialization as a shaper of preference (Burch 1969). Studies may focus on one's membership in social circles of leisure or social reference groups, for example, socialization in the surfing community (Devall 1973), or the influence of childhood recreation experiences on adult leisure patterns (Yoesting and Burkhead 1973; Sofranko and Nolan 1972). Common to all three perspectives is that amount and timing of experience as a participant is thought to be an important determinant of setting preferences, activity styles (trolling for bass versus fly casting for trout), and the social context of the outing (Bryan 1977).

The cognitive developmental level of an individual is by definition the amount and type of information a person has, and is thought to influence the frame of reference by which a participant evaluates recreation choices. In forming cognitive developmental models some indicator of the recreationist's accumulated experience is used to evaluate preference for recreation experiences or participation. Variables that indicate skill, knowledge, or familiarity may act as indicators. Among people with different amounts of recreation experience (and presumably development), for example, perceptions of crowding vary (Schreyer and Roggenbuck 1978).

Such learning or developmentally based approaches may better represent the mental process through which a person interprets life (and recreation opportunities) than static antecedent variables, which consider only past history. Traditional socio-demographic and personality approaches assume shared similarities in life history and home environment that help to define the mental processes through which recreation choices are made. The developmental approach attempts to describe the process by more directly quantifying the amount of information a person has relevant to the activity being considered. Thus, locating a person on a leisure development continuum provides a summary description, a frame of reference from which a person makes decisions about recreation.

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Further, a developmental continuum may be useful in analysis of change in decision-making styles. Research on recreation decision-making has focused on identification of the attributes of decision alternatives, the order in which they are considered, and the importance assigned to them. Both the attributes considered and the way they are combined and weighted in forming a decision are likely

to vary with the developmental level of the decision-maker. For example, some participants may become highly involved in an activity. If development were related to commitment we might expect more advanced participants to base decisions on attributes that facilitate an enjoyable experience and less on constraints (time or money) in their choices (Krumpe and McLaughlin 1982).

#### COGNITIVE DEVELOPMENT

Usually development is thought of in terms of growth in ability to acquire, organize, and use information--as a cognitive skill acquired with time and experience. To distinguish development from simple change, definitions of development usually imply progress, direction, and order along some continuum. In applying developmental theories to research on large-scale environment-behavior interactions, Moore (1976, p. 145) defines development as:

qualitative changes, differences, or variation in the organization of behavior such that what are called developmentally "more advanced" behaviors are more differentiated than what come to be called "lower" stages of behavior, and logically include and heirarchically integrate the "lower" stages...

Moore leaves open the question of whether a particular developmental stage is correlated with age or time. Differences in the organization of behavior or information may be described developmentally in the context of life cycle changes (ontogenetic development; along an age continuum). However, development may also be described as changes occurring at different periods of time (microgenetic development; for example, learning about a new city or achieving new levels of leisure satisfaction with increasing participation). In studies of cognitive complexity (Bieri 1966), categorization and judgment (Rosch and others 1976), and environmental cognition (Moore 1976; Williams 1980), persons more advanced in their interest and thinking within a domain (developmentally specialized persons), may be expected to perceive and structure elements within that domain in more complex ways and make finer discriminations among the elements. Thus, developmentally advanced recreationists are expected to process decision attributes in more complex ways.

#### A DEVELOPMENTAL MODEL OF RECREATION CHOICE

According to Flavell (1972) the three requirements for a developmental analysis of any behavior include: (1) specifying a set of acquisitions (what it is that develops), (2) identifying the order and processes involved, and (3) defining the time dimension of the sequence.

What is it that develops? For Flavell (1972) the items in a developmental sequence may refer to a structure, skill, concept, belief, attitude, bit of knowledge, or any other type of cognitive unit that a developmental psychologist might define and study. A logical starting place for examining

developmental sequences of recreation participation is to focus on what it is that recreationists choose among. A recreation activity often is considered the basic element of choice. Though such a definition is widely used, it is widely viewed as inadequate (Driver and Brown 1983). The activity concept perpetuates the belief that recreation is a behavior rather than an end state, which is equivalent to viewing education and health as behaviors rather than end states. Still, choices result in alternative behaviors and what is lacking is an adequate procedure for describing what has been chosen when we talk about recreation decisions. The set of acquisitions for development may be defined as the amount, type, and organization of information about recreation choices.

#### Cognitive Structure and the Elements of Choice

A consumer behavior analogy is behind many choice theories applied to recreation (Krumpe 1979). Recreation activities have been viewed as a product line in decision-making research. People participate in, make decisions about, and hold preferences for recreation activities--hunting, camping, and hiking, for example. Unlike most consumer products, however, participants can exercise some control in the design of their desired products and thus the experiences they derive from participation. To shape an experience, recreation consumers have three basic choice elements: activities, settings, and companions. Every decision to participate, consciously or unconsciously, includes a decision about what to do, where to do it, and whom to do it with. The research task is to describe the psychological structure of recreation choices (the underlying decision elements) and the dynamics of how these structures evolve and change with experience.

Past approaches to describing recreation choice have been too limited. For most research, an activity definition of recreation has been used in attempts to unravel the mechanisms of leisure participation. The nature of the activity, however, may not be the basis of participation. Activities may be subordinate to the social meaning of the participation (with whom we participate may be more important in the decision to recreate than what activity we select; O'Leary and others 1974). Or the nature of the activity may be subordinate to where recreation takes place (Ditton and others 1975). The basis for participation in any recreational activity also may be linked to some symbolic or emotional attachment to specific places or types of settings (for example, "Granite Peak" Wilderness or any national park; Williams 1980; Tuan 1977). Take the social basis of participation as an example. For a particular group of people who have gathered together to enjoy the outdoors, several activities and a variety of leisure settings may present equally satisfying recreation opportunities for the group. Therefore, what people choose are not activities as the term is commonly used, but what Driver and Tocher (1970) describe as recreation engagements highlighting the multi-element nature of recreation participation.

Three components, then, are needed to completely specify any form of outdoor recreation

participation--activities, settings, and companions. Such a model is not derived from empirical data; it is based on a survey of the literature. The three components, which appear scattered and unconnected in the outdoor recreation literature, may be combined to varying degrees to define what was chosen. The three components describe how recreation choices may be classified: recreation choices may be differentiated by activity categories, by setting categories, and by categories of social organization or interaction. Any one component is not considered in general to be more important, superordinate, or dominant; although the relative make-up, importance, or salience of any one component may vary across individuals and for any specific choice.

The developmental model begins with a multi-element choice structure as the set of developmental acquisitions. For any individual decision, the choice structure may be specified as a weighted combination of the three components described above: activity, setting, and social. All three are necessary to uniquely categorize any recreation choice. But not all possible combinations of activities, settings, and social groups are equally likely to occur. Some forms of activity and some settings naturally co-vary; canoeing requires a body of water. However, this should not be construed as a reason to ignore one component when describing a recreation choice. An activity may necessarily take place in a certain setting (fishing near water), but specifying the setting (water) is not sufficient to indicate the activity (fishing).

#### The Developmental Sequence

How does the cognitive structure evolve and change with development? Within the recreation literature, the specialization concept has attracted some attention (Bryan 1977) and appears particularly germane. Specialization in recreation behavior indicates an evolution of preference and style of participation in an activity from the general to the particular and may reflect changes in the role or importance of one or more of the decision elements. However, with Bryan's concept of specialization as a sequence of acquired behaviors a different set of acquisitions must be identified for each activity. An alternative approach, which may apply across activity types, is to expand the notion of activity specialization to include all of the recreation choice elements.

Specialization is one of two processes Flavell (1972) identifies for development that have significance for a developmental analysis of recreation choices. The other, differentiation, refers to the degree of structural complexity of a concept as it is organized in the brain. Differentiation as a developmental process involves making conceptual distinction where none had previously been made. Thus, what was initially a single, "undifferentiated" response becomes with development two "differentiated responses each restricted to one region of the original domain" (in this case two elements within the domain of a recreation choice).

Specialization in the cognitive literature is related to differentiation but is linked more to the content of cognitions than their structure. Differentiation of responses to some event results in each being a "specialization or delimitation of function which represents some sort of constraint or restriction on the way an individual will respond to an event" (Flavell 1972:300). Specialization represents a process of focusing attention on some subset of the differentiated structures. Specialization follows differentiation in that the brain must be able to differentiate two items before it can selectively attend to one over the other.

Building further a model of recreation development, components of a recreation choice become increasingly differentiated from each other (structurally more separate and complex, see fig. 1). As each domain becomes differentiated, specializations develop (a tendency to focus differentiation in some domains more than others). The limitation of Bryan's (1977) concept of recreation specialization is overcome because specialization is no longer tied to changes in content of a specific choice element (activity) to describe the specialization process.

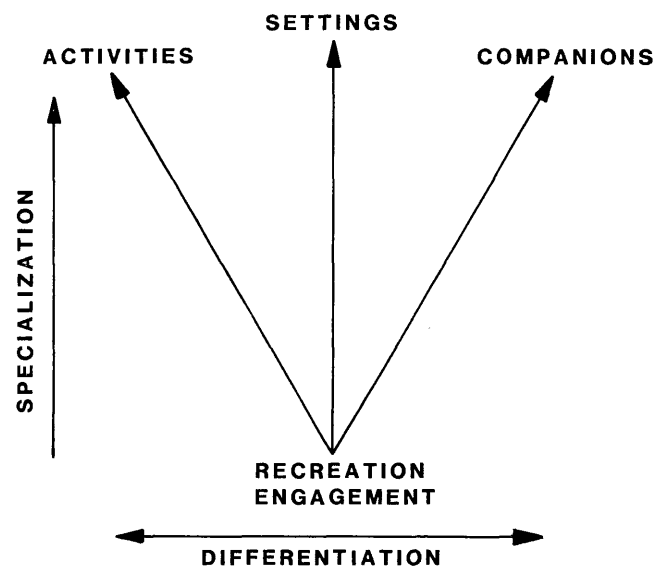


Figure 1.--As the three components of recreation choice become increasingly differentiated, specializations develop.

A tendency to focus attention, learning, or the acquisition of knowledge in one domain over another may be defined as specialization. Thus, for any choice, specialization is the relative cognitive differentiation within and perceptual orientation toward each domain; social character, activity type, and setting type. Thus, differentiation is the making of conceptual distinctions and specialization denoting the content domain where the differences are made. If, for example, a participant were to distinguish one choice from another with exclusive regard to the primitiveness of the surroundings he/she would be a setting specialist.

In a developmental sequence a decision-maker first perceives recreation choices as different to some degree (differentiation). The form that differentiation takes may be based on any of a number of components of recreation choices; the most prominent in the choice model are hypothesized to be activity, setting, and social group. Next in the sequence is specialization which refers to the contents or results of the differentiation process. Specialization may be described by specifying the domain in which differentiation is concentrated. An attempt is made to identify the type or nature of the conceptual differentiations of a decision-maker. To the extent that a decision-maker uses one or a subset of the possible components to differentiate recreation choices he/she may be described as a specialist. To the extent that a decision-maker uses all or a large subset of possible components he/she may be described as a generalist. Note, however, that "generalist" is not meant to imply one who is casually interested in many things, but one who differentiates recreation choices on many components. The generalist is perhaps the closest to what Bryan (1977) described as highly specialized; a participant who demonstrates an advanced technique and displays well-developed preferences for settings and companions.

#### The Developmental Continuum

As in any developmental study; subjects, responses, characteristics, skills, or preferences must be compared across some time continuum if we are to identify an ordered sequence. For most explanations of development the continuum is age of the subject. Moore (1976) argues, however, that experience in or familiarity with a situation may also be considered a developmental continuum. For studying recreation development, experience with the objects of recreation choice is the developmental continuum of interest; that is, the role of experience in how recreation choices are structured.

Wellman and others (1982) present the most complete attempt to measure amount of experience. They scaled canoeing experience along two dimensions, participation and commitment, using a series of questionnaire items. A single index was constructed by standardizing selected items and summing the score across all items. The approach would appear to be applicable to scaling experience in other activities.

#### ANALYSIS OF THE MODEL

The model was tested by examining the perceived similarities among a set of 15 recreation choices as depicted in color slides. From research on cognitive differentiation (Bieri 1966) it was hypothesized that increasing participation, involvement, and commitment to a recreation activity would result in increasing differentiation of similarity judgments. Further, differentiation would be concentrated along three dimensions--activity, setting, and companions. Individual subjects would display a specialization in the use of one or more of these dimensions in their similarity judgments.

A series of laboratory studies was conducted to evaluate the developmental model just outlined; two will be described here. The first study was used to scale a set of photographs in terms of the structure of recreation choices proposed in the developmental model (the three elements of choice--activities, settings, and companions). In the second study, subjects' judgments of recreation choices were compared at three levels of activity experience. Common to both studies was the use of photographs depicting alternative outdoor recreation choices. Fifteen color photographs, carefully selected through a series of pilot studies, varying in activity, setting, and social content, were used to elicit subjects' cognitive structure of recreation choices. These structures can then be compared across experience levels to identify how the perceived structure of recreation choices changes with development.

The first study served as a stimulus scaling procedure designed to assign scale values to each of the 15 photographs for each element of recreation choice. Ten judges were asked to sort the 15 photographs (in the form of 3½ by 5-inch prints) into categories according to three rules (the rules corresponding to each element in a recreation choice). In random order, judges were asked to sort the pictures into categories according to the recreation activity portrayed, the social group present, and the setting of the recreation outing. For each sorting rule, judges first sorted the pictures into as many categories as desired and then into three, five, and seven categories. An index of similarity between each pair of pictures for each sorting rule was derived by a method described by Ward (1977). This method assumes that the more categories available when two photographs are placed in the same category, the more similar are the two photographs. For each sorting rule, a two-dimensional matrix of similarities (photos X photos) was derived by averaging across the 10 subjects. The three resulting matrices were analyzed using SINDSCAL algorithm (Prusansky 1975) for individual differences multidimensional scaling.

Though a three-dimensional solution was hypothesized, a four-dimensional solution derived from the analysis provided the best fit to the data. The dimensions were labeled activity (active-passive), setting (primitive-urban), social (intimate/family-social/group), and land-water based on the pattern of dimension weights derived from the three sorting rules. The fourth dimension (land-water) that emerged in the judges' ratings was related both to the activities and settings portrayed in the photographs, indicating some covariance between activities and settings as represented in the photographs (fishing activities go with water and hiking with land).

The results, consistent with the model of recreation choice, were used in a second study that solicited photograph ratings from 60 subjects of varying levels of participation and involvement. Subjects judged the perceived similarity among all 105 possible pairs of photographic slides. Using individual differences multidimensional scaling these individual judgments were then fit to the

four-dimensional configuration of the photographs derived from the first scaling of photos.

Indexes for amount of participation in each of the activities shown in the photographs (fishing, canoeing, and backpacking) were constructed. Further, an index was constructed for nonparticipatory commitment and involvement in the subject's most preferred of the three activities following the method of Wellman and others (1982). This latter index included items concerning the importance of the activity to their lifestyle, membership in organizations, and expenditures on equipment.

Differentiation is indicated by the degree to which a subject's similarity ratings fit the four-dimensional scaling of the photographs; the greater the fit the more differentiated are the judgments along the four dimensions. In table 1 the correlations between developmental indexes and fit are listed. Only in the case of fishing experience was a significant correlation observed. Those higher on the fishing participation index showed greater differentiation of recreation judgments as indicated by fit.

It was further hypothesized that increasing participation and involvement would result in specialization in the use of the various dimensions of similarity judgment. Specialization, the importance of a particular element of recreation choice, is indicated by the relative importance of each of the four dimensions in describing (in terms of fit) a subject's similarity ratings. Correlations between developmental indexes and dimensional salience (importance) weights are given in table 2. Only two relationships were found significant. Greater backpacking experience was positively associated with the social dimension and involvement/commitment was positively associated with the activity dimension.

For both differentiation and specialization the results seem to be activity specific. No general trend of differentiation or specialization was identified for the various indexes. Therefore, relationships between the preferred activity and fit and dimensional salience weights were examined (table 3). A significant difference was found for the social dimension with fishermen using the social dimension in their judgments less than

Table 1.--Correlations of experience indices with individual fit scores

Developmental index	Correlation with fit index
Fishing experience	0.30*
Canoeing experience	- .10
Backpacking experience	- .05
Involvement/commitment	- .01

\*Significant at 0.01.

Table 2.--Correlations between experience indices and dimensional weights

Developmental index	Dimensional weight correlation			
	Land/water	Social	Activity	Setting
Fishing experience	0.15	-0.15	-0.09	0.07
Canoe experience	- .15	.01	.08	.13
Backpacking experience	- .14	.20*	.18	.02
Involvement/commitment	- .10	.09	.26*	- .11

\*Significant at 0.05.



Table 3.--Analysis of variance and group means for activity preference differences on fit and dimensional salience weight scores using Student-Newman-Kuels difference of means

Criterion	Activity Preference			F-value	SNK
	Fishing (n=11)	Backpacking (n=26)	Canoeing (n=23)		
Fit	0.74	0.67	0.69	0.47	
Social	.07	.14	.11	3.12*	F-B
Activity	.25	.39	.37	6.26*	F-B,C
Setting	.39	.30	.34	1.76	
Land/water	.39	.31	.32	.58	

\*Significant at 0.05.

backpackers. Further, those who preferred fishing used the activity dimension less than both canoeists and backpackers. Though not significant, the fishing group relied more on the setting and land-water dimensions than the canoeists or the backpackers.

#### CONCLUSIONS

Viewed in the context of the tentative and exploratory nature of the methods employed, finding partial support for the developmental model suggests that it has promise and warrants further investigation. The data provide the beginnings from which developmental patterns of recreation choice behavior may be studied. However, measurement of recreation participation levels (amount of experience and involvement) appears to be a major methodological constraint in the further exploration of developmental models. The lack of variance on the items used to build experience indexes and the low accuracy inherent in such self-report measures tend to moderate any real correlation between the perceived structure of recreation choices and amount of experience. An alternative would be to study groups of participants who have demonstrated different levels of skill and involvement (for example, participants in beginning versus advanced backpacking classes).

The model has important implications for substitutability research (Williams 1983). The elements of recreation choice represent the basic dimensions along which substitutes may be conceptualized. What constitutes a substitute depends on the developmental level upon which the decision-maker approaches the choice. An activity specialist, for example, is not likely to exchange the activity component of participation, but may be willing to participate in a different setting or with a different set of companions. Others may be more sensitive to setting or companion components of the choice, substituting activities to maintain satisfaction in a specific setting or with a specific group.

Future research might evaluate some of the implications of differentiation and specialization in a more direct decision-making context. For example, following Krumpal's (1979) study on influencing recreation decision-making, one might hypothesize that specialists (more experienced subjects) would be less likely to change choices when provided with information (consistent with their specialty) and that persons who differentiate recreation choices along activity dimensions might be more likely to make use of new information than those differentiating in setting terms. Further, different decision models might be tested with the hypothesis that specialists in one form or another might show different decision-making styles than non-specialists.

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## CHOICES OF WILDERNESS ENVIRONMENTS--

### DIFFERENCES BETWEEN REAL AND HYPOTHETICAL CHOICE SITUATIONS

Jean T. Beaulieu and Richard Schreyer

**ABSTRACT:** Factors considered most critical in selecting a specific wilderness environment in which to recreate are likely to vary depending upon the type of environment involved, the range and extent of experience of the recreationists, and the situational context of the decision (whether a real or a hypothetical decision was made). This study examines differences in factors considered in choosing a wilderness environment based upon whether the choice was an actual report of behavior or a hypothetical decision. A questionnaire requesting information concerning choices of wilderness areas in which to participate was administered to two groups. A sample of 325 recreationists were contacted on-site in wilderness areas in Utah and Wyoming and asked to report on why they had actually chosen that area. The second sample was a mail survey of Utah Wilderness Association members, and requested a hypothetical decision concerning a place in which to recreate and the factors used to make that decision. Responses were analyzed for the two sets in terms of the most important factor cited in making the choice, the degree of specificity of the most important factor, the total number of factors considered important in making the choice, and the combination of attributes considered important. In all cases, significant differences were noted.

#### THE USER/ENVIRONMENT INTERFACE

As the focus on wilderness moves from designation to management, there is a growing need for more accurate information concerning user relationships with the resource. One important concern is identifying which aspects of wilderness environments have the greatest influence on recreation choice behavior. This topic focuses on why certain areas are chosen, which trails are selected, what areas are perceived as desirable for camping, and what behaviors are seen as appropriate.

Actual attempts to carry out research on the topic have been fraught with difficulties concerning the measurement of attributes and the

link of reported significance to actual behavior. This paper reports one approach to assessing the environmental attributes which affect choice behavior, comparing potential differences between persons sampled in the wilderness environment itself and those who are sampled at home.

#### Attributes and Wilderness Management

Rather than being a trivial academic pursuit, this line of research has distinct implications for recreation resource management and planning. Knowledge of such relationships can assist management through identifying which criteria are most relevant for inventorying the resource. Further, it would be possible to target which types of information are most important in affecting recreationists' behaviors. To the extent that management may desire to affect that behavior, either to minimize impact on the resource or to enhance the experience for the visitor, such inputs will be critical to designing effective information systems.

The need for this type of information is augmented by the fact that the Recreation Opportunity Spectrum (Driver and Brown 1979; Clark and Stankey 1978) is currently the primary recreation planning tool used by the Forest Service and the Bureau of Land Management. It is based on the assumption that recreation experiences are dependent upon specific attributes of the recreation environment chosen by the recreationist. Therefore, environments are to be inventoried according to the types of experiences they can provide. A goal of recreation resource management using this model is to help recreationists match desired outcomes with settings that will maximize the probability of their attainment.

The ROS catalogs all lands into six different classes of recreation opportunity, from primitive wildlands to organized urban recreation. Designation is based on a complex list of attributes and weighting factors. A map of the entire management unit can be created showing the classification of each area, allowing the recreationist to pick his/her own desired mix of opportunities.

This classification scheme has been based almost entirely on measurement of physical characteristics, though many of the physical criteria do

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have obvious social or psychological aspects (e.g. remoteness). The Forest Service's ROS manual contains almost 15 pages delineating the physical requirements for classification, and less than one page apiece for social and managerial factors. This causes ROS to be primarily a physical inventory procedure that provides practitioners with little direct information concerning the recreationists' perceptions of the ability of the land to provide desired experiences.

In order for such a planning system to operate effectively, it must be able to determine: 1) which attributes of the environment are important for the production of a quality recreation experience, 2) what specific aspects of the environment affect recreation behavior, 3) what aspects of the same environment are sought by recreationists desiring different experiences, and 4) how the diversity among users can be more effectively characterized.

With this information the manager may be able to formulate the most practical method for providing recreation opportunities that realistically allow his/her clientele to increase the benefits obtained from the recreation experience while protecting the character of the resource. One approach to gathering this information and understanding the influence of environments on behavior is to study the way people cognitively organize information about environments. This suggests an examination of the types of information used to classify and understand natural environments, and the way in which that information varies across different types of users. In other words, we believe the best way to approach the link between environment and behavior is to study the way that link is made in the mind of the user. We have approached this through the analysis of environmental images.

#### The Image of the Environment

Psychologists studying cognition do not know what specific processes are involved in image formation, though it is a simple activity for most persons. For example, a subject can be asked to imagine a wildland campsite, and the task is readily accomplished. Images consist of many constituent fragments that combine to form the individual's conception of a given environment. There is an interactive process between mind and environment which suggests that "images are not static pictures but are processes that begin and end with varying existence" (Bugelski 1971:35). There is an element of creative construction involved in that attributes presently recorded by the senses often stimulate the mind to remember other attributes that past experience indicates should be correlated. This creates a composite image uniting observed and imputed characteristics (Bunting and Guelke 1979).

The image of wilderness is not created simply by observation of the physical environment, since

it is also contained within a psychological realm, symbolizing many internal meanings and needs. When discussing the image of an environment it must be remembered that it will be experienced as a unified field, no matter how many attributes must be mentally added to complete the image. This internal representation will not be an exact depiction of what others perceive to be out there. The image will be distorted by the perceiver's own set of wants, purposes, preferred attributes, and symbolic values. These will be strongly influenced by the definitions of place meaning and value espoused within the individual's culture. This should particularly encourage researchers looking for attribute/behavior links to broaden their studies to include other dimensions of attributes besides the physical (Moore 1979).

It is important to note that the concept of environmental image carries with it some conception of appropriate behaviors. "Designers and architects have long known that the form and appearance of a building influences certain behaviors that take place within it" (Ittelson and others 1974:1). This aspect of environment, its influence over behavior, is of great importance when wildland recreation places are considered, as it suggests that the meanings assigned to such places are likely keyed to the uses we make of them. Thus, the attributes we use to construct our mental images should be tied to behavior.

We assume recreationists use some form of categorization process for keeping images organized when they are involved in recreation planning. For example, if a recreationist feels like going fishing, he/she mentally runs through a list of places where fishing is allowed and then selects a particular place. Each recreation activity may have many subcategories (e.g. fly fishing vs. bass fishing, places where the rest of the family can have fun while I fish).

The question remains as to how images of environments may best be measured. We have taken the approach of using open-ended responses from recreationists. Bugelski noted (1971) that reports of images are still only reports, not images. Since no one has discovered where images reside, or any physical trace of an image, researchers dealing with images must be prepared to have them shift and change quite readily. This changing of cognitive representations probably is not a serious problem, as many attributes of a desired recreation experience will likely remain constant. Once again, there are only so many elements which will contribute to participation in certain activities; however, the relative emphasis on these may change.

#### Cognitive Sets and Behavior

A helpful way to organize the variability in images is to think in terms of a "cognitive set." A cognitive set is "a plan to select

specific types of data for processing or to perform specific mental operations on information being processed" (Leff and others 1974:396). Cognitive sets are useful in that they 1) cause the respondent to give priority to specific types of attributes, and 2) assume that the various constructs are interrelated with associated meanings. Thus, when a person thinks of an area, a generalized category for that type of area is accessed in the mind, which should result in the generation of specific types of attributes.

When a person visits a wilderness area the observed behaviors are a physical manifestation of the outcome of an internal cognitive process. The recreationist made a choice and the choice was dependent on that person's past reinforcement history, or experience. This suggests a more or less consistent pattern of learned behaviors in particular types of environments, or "activity style." Such a pattern would likely generate a fairly consistent cognitive representation of any type of recreation engagement. The image generated would be continuously modified by information concerning new recreation places and activities, and by constraints on potential behaviors present in the environment.

While images are dynamic, they are nevertheless likely stable enough to be measured. Mack (1971) spoke of the basic conservatism that people display in regards to past successful decisions. It is psychologically easier to repeat an action that was previously successful than to attempt an untried action. As the pattern of behavior becomes more ingrained the range of choices becomes more restrictive, but as experiences are gained the number of known recreation places (that satisfy the basic requirements) should also increase.

Thus, one of the most important factors affecting choice behavior should be the amount and type of experience a person has had with the activity. The image of a recreation place would be much richer and more complex for someone who has experienced many different types of places. This richness suggests that while a person with more experience may be looking at the same environment, he/she may be seeing more detail. Thus, the attributes responded to may exist at a more detailed or specific level of organization.

If recreationists respond to attributes at differing levels of specificity, they may not react similarly to pre-set lists of attributes. This suggests that amount of experience should be used as a control variable in establishing relationships between environment and choice behavior. Further, the specificity of attributes considered (the level of organization most directly related to choice) should be examined as well as the type of attribute.

#### Assessing Choice Behavior

When recreationists begin to choose where they will engage in their next recreation experience

they must begin by delineating the problem space and the task structure. Both of these are difficult for the researcher to discern, since these activities may be occurring subconsciously and all that can readily be observed are the outcomes (where the recreationist went), which are visible and unambiguous.

We believe the most accurate way to ascertain information on this step is through self-reporting by the user. The content of this self-report should be greatly influenced by the recreationist's activity style, which will specify the place and activity that the respondent will discuss and by the level of experience, which will affect the number and kind of attributes that will be readily accessible by the respondent.

One of the problems in decision research is how to present the problem in a totally naturalistic manner so that the problem has not already been decomposed into only a few dimensions. This decomposition might make the research design easier since it will help control the number of variables, but it may make the validity suspect. Most present research has the decision-maker being given a list of potential attributes, with the task of choosing among them (Phelps and Shantreau 1978; Slovic 1975). It is likely, however, that real world decisions are not made in this disjointed manner. In the real world the decision-maker has a great deal more influence over what type of decisions will be made and what type of information will be examined before the final choice. Thus, in order to gather realistic information, the subjects must be presented with a holistic representation of the pre-decision situation and be allowed to access whatever information is deemed relevant.

There are two ways such an analysis can proceed. First, persons actually visiting wilderness environments could be sampled. Such persons will have already screened information to make a choice, and the behavior will be real. A self-report in this situation would be most directly tied to the environment/behavior link. Such a methodology, however, is time consuming and expensive. As wilderness users tend to disperse themselves, the generation of a sufficient sample size to provide reliable results could be very costly.

A second approach would be to contact persons at home, through a mail questionnaire for instance, in order to generate large numbers of responses. Persons could be requested to make a hypothetical decision, based upon their previous experience, and the results would thus be tied to potential recreation choice behavior. The question, of course, is: How representative of real choices in the field are hypothetical choices of similar environments?

This paper reports a study that seeks to obtain open-ended responses concerning the attributes considered important in making choices for wildland recreation environments. Attributes are analyzed in terms of the most important

factor used to make a given choice, the degree of specificity of that factor, the total number of factors considered important to the choice, and the mix of attributes considered. Further, we make a comparison of two methodologies used to collect these data: real choices reported by recreationists in the field and hypothetical choices made by respondents answering a questionnaire at home.

## METHODOLOGY

### Study Instrument

The questionnaire used in the study was the end result of four pretests involving over 200 subjects. Two forms were used: one designed to be a mail-out questionnaire, and one designed to be administered on-site. In the mailed version, the wording reflected the fact that the choice of an environment being made was to be hypothetical. It requested an initial choice of a preference between a mountain or desert environment. To respondents residing in the Intermountain West opportunities for both are equally attainable. The questionnaire then asked respondents to choose where they would go for a three-day weekend. Potential limitations of money, time available, and access to transportation were removed from the decision process, so that preference for the environment would be the major consideration. In the case of the on-site questionnaire, respondents were asked why they had chosen the particular environment in which they were contacted.

### Sample Populations

Two sets of respondents were used for the actual and hypothetical choice situations. The actual choice situation involved an on-site administration of the questionnaire to 324 wildland users. Areas sampled were both mountain and desert wildland environments in the Intermountain West. Persons on hiking/backpacking trips were approached at trailheads or campsites and asked to complete the questionnaire. All members of a given party were requested to complete the questionnaire. Success rate in questionnaire completion was 95 percent.

Areas sampled included both National Park Service and National Forest backcountry areas. For mountain environment, the High Uintas Primitive Area, the Bridger Wilderness Area (both USFS) and the backcountry of Grand Teton National Park were used. For the desert environment, Canyonlands National Park was used. Approximately two-thirds of the sample involved mountain environments.

The hypothetical choice situation required a sampling technique that was targeted toward known users of wildland environments. Even in the Intermountain West, the proportion of persons engaging in such recreational activities is relatively low. A general population sample would likely yield a very small response rate of actual participants.

In order to maximize the probability that the persons contacted would be participants, members of the Utah Wilderness Association were chosen as respondents. That organization made its mailing list available for the purpose of the study. While restriction of a sample to membership in one group could introduce bias into the survey, it was also a realistic aggregation of persons most likely to have a large amount of information concerning the actual use of these areas. Response rate to the questionnaire was 255, or 68.4 percent.

### Independent Variables

Choice context and environmental context.--The two samples represented the real or the hypothetical choice situations. The environment chosen was also used as a control variable, as there might be significant differences in the attributes chosen depending upon whether a mountain or desert environment were selected. For the hypothetical group, their stated preference for mountain or desert was used. For the on-site group, the actual location of sampling was used.

Experience use history.--The amount of experience in this type of recreation was measured through a series of questions on previous participation. The dimensions used were length of time participating in wildland recreation, the average number of visits per year to such areas, and the total number of areas visited. Responses to each variable were standardized, and a composite value was assigned to each person. This overall value was divided by thirds, so that the group represented low, medium, and high experience values.

### Dependent Variables

Most important factor.--Respondents were requested, after having made their choice, to list the most important factor in making that choice. The range of response was reduced to a more manageable list by a coding process developed through a pretest of a similar question. Fifty-four students in three classes at Utah State University generated 163 different attributes in making a similar choice. These attributes were sorted in a panel procedure into twelve different classification groups.

In order to allow for multivariate analysis, these twelve were ultimately reduced to four general categories. Attributes related to specific activity participation were labeled Activity Attributes. Physical Attributes were developed from categories previously labeled as Landscape Characteristics and Landscape Character. Psychological Benefits and Social Benefits were combined into a category called Social/Psychological Attributes. Finally, a category called Managerial Attributes was created out of those labeled Restrictions, Developed Areas, Access, Size and Management Setting.

**Specificity.**--The rating of specificity was also developed in the pretest. Once the four categories had been established, the attributes listed under each category were rated by a panel as to the degree of specificity of the label. The rating was made in reference to all other attributes, so the frame of reference was comparative as opposed to absolute. Four categories ranging from most to least specific were pre-determined, again allowing a basis for comparison.

**Number of attributes.**--After the most important attribute in the decision had been identified, respondents were asked to list any other factors which were important in the choice of the target environment. This was presented in an open-ended format so that the limit was set by the respondent. The total number of attributes listed was registered.

**Mix of attributes.**--Recognizing that the total set of attributes listed would range across several or all of the categories, a variable was created to represent the overall pattern of response. A decision rule was established that one of the four categories of attributes would only be considered if the number of attributes in that category mentioned made 15 percent of the total number of responses. Otherwise, the amount of detail would be virtually meaningless.

This process led to the development of fifteen different combinations of attributes. In order to reduce this number to a manageable level for purposes of comparison, groups were clustered based on similarity. It was noted that each

group not containing a Physical Attribute comprised less than 4 percent of the total responses. Only three groups containing a Physical Attribute comprised less than 4 percent of the total. Thus, all groups not containing a Physical Attribute were consolidated, and the three groups including the physical component with less than 4 percent response were eliminated. This left a total of seven combinations. The most common grouping was of Physical and Social-Psychological attributes, which represented 19 percent of the total sample. Next was the non-Physical class, which was a combination of all attribute classes naming no specific physical attributes, representing 17 percent of the responses. Next was the response mix of Physical/Managerial/Social-Psychological attributes (14 percent). The category containing only Physical Attributes comprised 13 percent of responses, followed by the Physical/Activity/Social-Psychological mix (12 percent) and the Physical/Managerial mix (10 percent).

## RESULTS

**Most important factor.**--The most important factor was categorized according to the four major classes of attributes. A contingency table was generated for the comparison of real vs. hypothetical choice on the attribute selected as most important. Two analyses were performed, controlling for mountain vs. desert environment. No control was made for amount of experience, as a previous analysis showed that there were no significant relationships between experience and the dependent variable.

Tables 1 and 2 show the results of these analyses. For the mountain environment, the  $\chi^2$

Table 1.--Results of the crosstabulation of kind of attribute considered the most important factor in the current decision on place to recreate. This contingency table was generated for respondents in the mountain environment

Kind of attribute	Actual No. (%)	Decision context	
		Hypothetical No. (%)	Total No. (%)
Physical	54(25)	36(26)	90(25)
Managerial	33(15)	34(24)	67(19)
Activity	36(17)	3(2)	39(11)
S-psych	93(43)	67(48)	160(45)
Chi square = 20.47 N = 356	3 degrees of freedom		Significance = .0001

Table 2.--Results of the crosstabulation of kind of attribute considered the most important factor in the current decision on place to recreate. This contingency table was generated for respondents in the desert environment

Kind of attribute	Actual No. (%)	Decision context	
		Hypothetical No. (%)	Total No. (%)
Physical	32(31)	34(32)	66(29)
Managerial	19(18)	12(11)	31(14)
Activity	17(16)	9(8)	26(11)
S-psych	36(35)	61(49)	106(46)
Chi square = 13.57 N = 230	3 degrees of freedom		Significance = .004



was 20.47 with  $p < .0001$  while in the desert environment, the  $X^2$  was 13.57 with  $p < .004$ . In the mountain environment, major differences appear to be a tendency on the part of persons in the hypothetical context to mention managerial attributes more frequently, with a slight tendency to mention social-psychological attributes more frequently. Persons in the actual decision context mention activity attributes much more frequently, while physical attributes are mentioned about evenly.

In the desert environment, the equality in the tendency to mention physical attributes is maintained, as is the tendency for persons in the actual decision context to mention activity attributes. The situation, however, with managerial attributes is reversed, as persons in the actual decision context mention these much more frequently, while the tendency for persons in the hypothetical mode to mention social-psychological attributes is increased.

Specificity of attribute.--The level of specificity was analyzed using a three-factor analysis of variance. The factors used were level of experience, environment (mountain vs. desert), and decision context. Table 3 shows the results of this analysis. While difference in environment failed to register a significant difference, both amount of experience ( $F=3.4$ ,  $p < 0.04$ ) and decision context ( $F=7.1$ ,  $p < .01$ ) attained an acceptable level. In terms of actual numbers, persons in the hypothetical

context had an average specificity of 2.3, while those in the actual context averaged 2.5, indicating a lower level of specificity.

Further, in both analyses, there was a two-way interaction between the decision context and the type of environment. Analysis of this interaction showed that persons in the desert context in the hypothetical situation picked attributes that were rated much more specific (2.1) than those in the real decision context (2.7). In the mountain environment, however, the difference was virtually non-existent.

Total number of attributes.--A three-factor analysis of variance was also performed on the total number of attributes mentioned as being important to the choice of a recreation environment. Results were significant ( $F=71.7$ ;  $p < .001$ ), as persons in the hypothetical decision context named more attributes (5.0) than those in the real context (3.4).

Attribute mix.--Tables 4 and 5 show the results for the analyses involving the mix of attributes compared by decision context, controlling for mountain and desert environments. In both cases, results were significant (mountain  $X^2=30.1$ ,  $p < .0001$ ; desert  $X^2=30.0$ ,  $p < .0001$ ). For both environments, there was a tendency for persons in the actual decision context to mention physical-managerial and non-physical attributes more frequently, and physical/social-psychological attributes less frequently.

Table 3.--Results of the hierarchically arranged analysis of variance examining the specificity of the most important factor in the current choice of a place to recreate

Source of variation	Sum of squares	DF	Mean square	F	Signif of F
Main effects	10.115	4	2.529	3.516	0.008
Experience	4.944	2	2.472	3.437	0.033
Decis. context (D.C.)	5.072	1	5.072	7.051	0.008
Envir. context (E.C.)	0.099	1	0.099	0.137	--
2-way interactions	18.405	5	3.681	5.118	0.000
Experi X D.C.	1.201	2	0.601	0.835	--
Experi X E.C.	1.621	2	0.811	1.127	--
D.C. X E.C.	12.378	1	12.378	17.209	0.000
Explained	30.565	11	2.779	3.863	--
Residual	414.313	576	0.719		
Total	444.878	587	0.758		

N = 588

Table 4.--Results of the crosstabulation of the attribute mix generated in the current choice of a place to recreate. This contingency table was generated for respondents who had chosen mountain environments

Attribute mix	Decision context		Total No. (%)
	Actual No. (%)	Hypothetical No. (%)	
Phys	14(8)	8(6)	22(7)
Phys/S-psych	23(13)	31(24)	54(17)
Phys/Mana/S-psych	18(10)	10(7)	28(9)
Phys/Act/S-psych	24(13)	13(10)	37(11)
Phys/Managerial	27(15)	8(6)	35(11)
Non-physical	75(41)	33(27)	108(37)

Chi square = 30.14      5 degrees of freedom      Significance = .0000  
N = 312

Table 5.--Results of the crosstabulation of the attribute mix generated in the current choice of a place to recreate. This contingency table was generated for respondents who had chosen desert environments

Attribute mix	Decision context		
	Actual No. (%)	Hypothetical No. (%)	Total No. (%)
Phys	2(2)	6(5)	8(4)
Phys/S-Psych	21(24)	35(29)	56(27)
Phys/Mana/S-psych	8(9)	30(25)	38(18)
Phys/Act/S-psych	7(9)	21(18)	28(14)
Phys/Managerial	16(18)	4(3)	3(10)
Non-physical	34(38)	24(20)	58(28)
Chi square = 29.95 N = 208	5 degrees of freedom	Significance = .0000	

## DISCUSSION

### Sample Differences

There were differences across all dependent variables, depending upon whether the response format was a self-report of a real choice in the field or a hypothetical choice made at home. Several reasons may account for the differences. In the case of the total number of attributes listed, the fact that persons at home would list a greater number is certainly understandable, as they would have more time to reflect on possible choices.

The other differences are less straightforward. It is likely that many of the differences are a function of the nature of respondents in the two samples. The field survey interviewed persons in the backcountry, regardless of their philosophy or commitment to the resource. On the other hand, the mail survey contacted persons who were members of the Utah Wilderness Association, which implies both a philosophical and emotional commitment to such environments. Further, such persons may not actually be users of the resource, but may only support it for the knowledge value of its existence.

There were significant differences in the actual amount experience use history of the two groups. As might be expected, members of the Utah Wilderness Association were on average more experienced than persons contacted in the field. Forty-one percent of the hypothetical group were rated high in experience as opposed to 27 percent of the actual group. This increase, however, in experience was accounted for through hierarchical extraction in the analyses of variance. In other words, variance explainable by differences in amount of experience use history had been removed before the analysis on decision context was performed. In the case of the two Chi-square analyses, both were run only after it had been determined that experience did not have a significant influence on the results.

Beyond experience, however, is the intangible value/commitment factor. A person who is sufficiently interested in wilderness to join the Utah Wilderness Association may be prone to have

read more material on such environments, and could likely pay attention to different types of environmental features. This could also imply a different pattern of motivation for participation, leading to differing demands upon the environment. It is not, however, entirely clear just how these differences specifically influence the results obtained.

### Patterns of Response

Respondents in the hypothetical context in both environmental types were less likely to name activity attributes. It is possible such respondents would be less concerned about what they would specifically be doing than on-site respondents, for whom the actual activity was much more immediate. In contrast, respondents in the hypothetical mode tended to name more social-psychological attributes. Further, hypothetical respondents choosing mountains tended to name managerial attributes more often than those in real choice situations, while those choosing desert environments tended to name such attributes less often.

Deserts in the Intermountain West are primarily administered by the Bureau of Land Management, an agency not having many regulations concerning behavior. It is possible the hypothetical choices were geared more toward such environments, while respondents in the real choice situation were interviewed in a National Park, an environment with much more regulation. In the case of mountain environments, the implied presence of either Forest Service or Park Service administration might result in a higher level of concern for managerial control from the hypothetical choice population, while persons contacted in such environments may have experienced a successful trip without being hindered by regulations.

The disproportionate emphasis on social-psychological attributes was present in the analyses on attribute mix. It is possible that persons imagining such trips might tend to place greater emphasis on potential psychological benefits of participation such as escaping the routine and having solitude, while persons on-site

might be more concerned with the immediate activity. This was supported by the higher frequency of response for on-site respondents in the activity categories.

Persons in the hypothetical mode were considerably more specific in identifying attributes for desert environments than persons contacted on-site. This difference did not show up in relation to mountain environments. It is possible that the image of the desert is a much more variable construct than that of mountains. While one may assume that mountain ecosystems are more diverse than arid ones, the features of such environments may be more widely known, and persons from varying backgrounds may tend to report such images similarly.

Deserts, however, are much less known as environments, and there may be a greater range in the ways such environments are known. It is conceivable that Utah Wilderness Association members have a higher interest in this type of environment, and as mentioned, may have seen more literature concerning it. As a result, their images might contain more specific types of information. Whatever the explanation, these differences suggest that an exploration of the potential differences in image composition between different types of environments would be fruitful.

#### CONCLUSIONS

The differences in the response patterns for the two types of survey suggest that results from studies using either approach be limited in their generalization. Of most importance, mail-back studies completed by persons at home may not be very accurate indicators of preferences for real choices of recreation environments. This is of particular concern as recreation planners seek to gather public input for resource inventory purposes. While it may be easy to dismiss the differences reported here as being solely due to the different types of respondents, such an effect is not in and of itself proven.

There are pragmatic concerns which must also be addressed. A general survey of the public would have required a much more costly mailing to find an adequate sample of backcountry recreationists. Any mailing list of identified users would potentially introduce bias. For instance, it could have been possible to use addresses from backcountry permits issued by either the Forest Service or Park Service. This would, however, select for persons willing to use areas where permits are required assuming they were mandatory, or for persons willing to fill them out in places where they were voluntary.

While it is always easy to call for "further research," the results of this study provide support for the need to establish more systematically the nature and extent of these

differences before the use of survey data can be generalized sufficiently to be incorporated into planning/management systems.

#### ACKNOWLEDGMENT

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# DO CHOICES OF SPORT FISHERIES REFLECT ANGLER PREFERENCES

## FOR SITE ATTRIBUTES?

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**ABSTRACT:** A revised recreation choice model is proposed and partially tested using results of a 1980 survey of Colorado anglers. Results of discriminant analyses show modest and useful prediction from preference for trout fishery site attributes to choice of type of fishery used.

### PURPOSES

During the past 20 years, considerable research has studied the preferences and behaviors of outdoor recreationists. Those studies have had economic (e.g., Dwyer and others 1977), sociological (e.g., Cheek and Burch 1976), psychological (e.g., Knopf 1983) and other disciplinary orientations. Topics examined have been varied and include psychological need assessment (Tinsley and Kass 1980), visual perception and landscape assessment (Elsner and Smardon 1979), recreation experience preference (Driver and Brown 1978), conflict resolution (Jacob and Schreyer 1980), user satisfaction (Dorfman 1978), and trend prediction (Stynes and others 1980). Most of the studies conducted within each of these areas have attempted to understand and explain recreation behavior. Only a few studies have focused on predicting the users' choice of recreation activities, settings or areas from a variety of independent variables.

Two situations help explain why greater predictability has not been attained between area, site, or activity choice as dependent variables and area attributes, experience preferences, and other independent variables. One has been the general tendency of recreation behavioral scientists to report results of

statistical tests of differences between classes and subclasses of independent variables, but not report amounts of variance explained. The other has been the infrequent use of theoretical models to suggest probable paths of statistical association (Driver and Knopf 1981, Tinsley 1984).

Because efforts are needed to both improve explanation and prediction of choice as a critical component of recreation behavior, this paper presents and partially tests a revised cognitive model of recreation site choice. The model builds on other models presented in the literature (Harris 1983, Krumpke and McLaughlin 1982, Haas and others 1981, Driver and Brown 1975). Its new dimensions are that it emphasizes the concept of constrained demand (or preferences), and it details more explicitly the conceptual link between preferences for specific setting attributes of a site and preferences for specific types of desired experiences.

The model applies to all recreation area/site choices. After it is described, the model is partially applied to test two hypotheses about choice of sport fisheries in Colorado:

1. Preferences for the attributes of specific types of Colorado sport fisheries will be significantly related to anglers' choices of fisheries.
2. Choices of Colorado sport fisheries actually used will be influenced by constraining and facilitating attributes of those fisheries.

### A REVISED MODEL

The revised model of recreation area and site choice (figure 1) draws heavily on our previous research (Harris 1983, Driver and Brown 1975).

One feature of the model is its elaboration of the concept of constrained demand. Constrained demand is emphasized, because the model recognizes that most human decisions are strongly influenced by limited money, time, and other personal resources and capabilities. Demands, and behavior, are constrained psychologically, too, because most individuals are limited in the amount and complexity of information they can process while making decisions.

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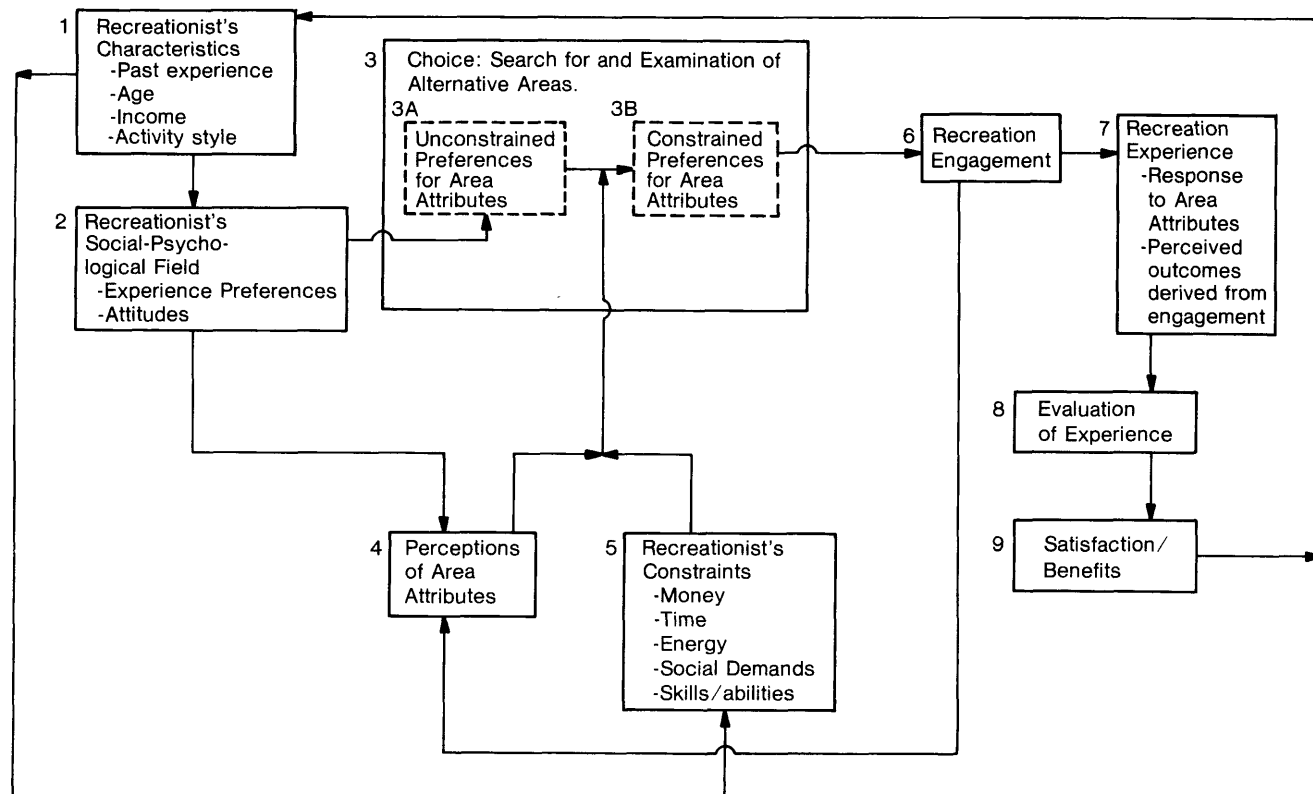


Figure 1.--A behavioral model of recreation choice.

An example of a current recreation planning problem, the allocation of fishery management resources to different types of Colorado fisheries, is used to clarify the model components and their relationships. To simplify the discussion, the model depicts the process with which a given angler chooses to visit a particular type of sport fishery.

The model begins with a potential recreationist with distinguishing characteristics (Box 1). That recreationist possesses a "social psychological field" (Box 2), which consists of mental constructs including motives and attitudes. One distinction made in this conceptualization is that angler attitudes include preferences for particular site attributes that can be used to distinguish among different types of settings, while angler experience preferences are antecedent to attitudes toward site attributes, may be less salient, and may or may not be attribute-dependent. Thus, the experience preferences explain the "why" behind the setting attribute preferences which relate to "what for whom." The extent to which these attributes are expected and valued depends on the extent to which an angler has specialized in the activity of fishing. Attributes theorized to be relevant here include fish-related attributes (e.g., species of fish, rate of catch, etc.) and other setting attributes (i.e., biophysical, social, and managerial site attributes).

These preferences for setting attributes, however, are unconstrained preferences (Box 3A); an individual's schedule of unconstrained preferences is represented in microeconomic theory by the concept of a utility function. In reality, limits exist on the use of any site that stem from the interaction of the recreationist's perception of site attributes (Box 4) and actual constraints on the recreationist (e.g., money, time, skill level, group norms, etc; Box 5). We theorize that factors such as the distance traveled to a site are perceived to be constraining attributes of that site, and that the recreationist's experience preferences and attitudes can significantly influence his/her perceptions of a site and its constraining attributes.

In the face of these constraints, the individual chooses among the attributes of available alternative sites. The site finally chosen represents the decisionmaker's constrained set of preferences for site attributes (Box 3B). This concept of constrained preferences parallels the concept of demand as formulated in microeconomic theory; demand curves are, in theory, derived by tracing out these price-quantity points where each individual's indifference curve (which reflects that individual's utility, or unconstrained preferences) intersects his/her budget constraint function. Implicit in this decision

process is a consideration of the values and expected levels of the salient attributes of the various alternative sites. Only minimal levels of availability may suffice for some site attributes, and the decision process in which site attributes are considered may be more appropriately modelled with a lexicographic choice rule than with the mental calculus implicit in subjective expected utility models.

If the individual recreates at the site chosen (Box 6), that recreationist will experience the site attributes and perceive that certain outcomes have been derived from that engagement. This response to the engagement is the recreation experience (Box 7). The recreationist evaluates the site and the experience by comparing the attributes and outcomes expected and desired from the engagement with those actually experienced (Box 8). It is on the basis of this comparison that the individual assesses his/her satisfaction with the site (Box 9).

This conceptualization provides an extended framework that integrates both site choice and recreation experience evaluation in a model of recreationist decisionmaking. Perhaps the most basic relationship suggested by our model is that between the recreationist's constrained preferences for site attributes and his/her choice of a type of site to visit. Although this conceptual link underlies both theory of recreation choice and consumer demand theory (Lancaster 1971), little research to date has attempted to assess the correlation between actual choice behaviors and stated preferences for particular site attributes (both constraining and facilitating).

## METHODS

### Subjects

The data were collected in 1981 as part of a survey of angler demands for Colorado sport fisheries. A random sample of persons who had acquired licenses for fishing in Colorado in 1980 was drawn. Questionnaires were mailed to these individuals in two waves, followed by a postcard reminder. Of the total sample of 1502 licensees, 484 (or 32 percent) returned usable questionnaires.

Although this rate of response was relatively low, it was of the same order of magnitude as that obtained by the Colorado Division of Wildlife on its annual angler surveys. A telephone survey of a sample of nonrespondents indicated that most nonrespondents were minimally interested anglers and that they were not users of any particular type of fishery. Thus, the survey responses obtained were probably from the more serious, concerned,

and actively participating anglers. Given that these are the anglers whose desires and preferences are likely to be of greatest concern in fishery management planning, this sample was judged to be adequate.

### Data Preparation

The responding anglers were asked to record the number of fishing trips they had taken to each of four types of fishing sites: (1) wild, or trout fisheries in mountainous areas that are not readily accessible by vehicle, (2) basic-yield, or trout fisheries in mountainous areas that can be easily reached by vehicle, (3) rural, or mixed species waters, typically cool or warm, in nonurban areas of Colorado, and (4) urban, or warm-water fisheries bordering or within the cities of Colorado. In addition, respondents were asked to indicate the type for which they had recorded the highest number (i.e., the most frequented fishery type). As a validity check, the consistency of the responses to these two methods of measuring the most frequented fishery type was investigated and the case involved was dropped from the analysis when an inconsistency was found.

The anglers also responded to 32 preference items in terms of the last (most recent) trip they had taken to a fishery of their most frequented type. For these items, the respondent was asked to rate the importance of biophysical, facility, social, and fish-related attributes for choosing the fishing site visited on that trip, using a six-point Likert-type scale with response options ranging from Not At All Important (1) to Extremely Important (6).

### Analysis

The 32 preference items were clustered into groups on the basis of correlations among the responses to those items using the ICLUST VI clustering program. ICLUST VI first searches the initial item pool for that pair of items which is most highly correlated, and these items are combined to form a cluster. This procedure is repeated and the remaining items and clusters, are formed into higher-order clusters until Cronbach's alpha or an estimate of "coefficient beta" (the worst split-half reliability) of the combined cluster would be less than that of sub-clusters. This clustering procedure and subjective judgment were used to decide the content of the final scales. To obtain scale scores, an average was taken of respondent's ratings on all of the items comprising that scale.

Next, discriminant analysis was used to determine significant differences in the attribute preference scale scores of four groups

identified on the basis of the fishery type they reported they visited most frequently. The groups identified by choice of a type of fishery to frequent were the dependent variable, and the attribute preference scales were the discriminating or independent variables. Given that the weighting coefficients in the discriminant function are a measure of the correlation between the independent variables and the discriminant function (and are thus roughly analogous in interpretation to the beta weights in regression analysis), this analysis suggests the relative importance of the preference scales for discriminating among the groups.

## RESULTS

Cluster analysis of the attribute preference items resulted in six multiple-item scales and four single-item scales (see table 1). Reliability coefficients for the six multiple-item scales ranged from 0.75 to 0.88.

The numbers of respondents reporting a choice of each of the four fishery types are listed in table 2. A total of 260 fishermen (70%) preferred the basic-yield type of fishery, 77 (21%) chose the wild type of fishery, 25 (7%) the rural type of fishery, and 9 (2%) the urban type of fishery.

Also included in table 2 are the group memberships of the respondents predicted on the basis of their discriminant function scores. As that table shows, 43 percent of the individuals who were predicted to be in the basic-yield group were in fact in that group, 77 percent of those predicted to be in the wild group were in that group, 40 percent of those predicted to be in the rural group were actually in that group, and 89 percent of those predicted to be in the urban group were in that group. Overall, 51 percent of the cases were correctly classified.

The results of the discriminant analysis suggested that significant differences did exist in the attribute preferences of anglers choosing different types of recreation areas to visit most frequently. As table 3 shows, the square of the canonical correlation for the first and most important discriminant function was .33, the proportion of the variance in this function associated with the dependent variable. This function accounted for 48.6 percent of total variance in the discriminating variables. (See Brown and Tinsley 1983 for a discussion of evaluating discriminant functions.) In addition, 7 percent of the variance in the second function was associated with the variance in the dependent variable; that second function accounted for an additional 7.8 percent of the total variance in the discriminating variables.

Table 3 also lists all the attribute preference scales that were included as independent variables in the discriminant analysis, along with the mean importance ratings of the four choice-based groups. The first function is

Table 1.--Items for attribute preference scales, with scale reliability coefficients.

Scale items	Reliability Coefficient
Familiar waters	NA
New waters	NA
Waters close to home or work	NA
Fast-moving waters	NA
Trophy fish	.90
-- Catching as large a fish as you can	
-- Catching trophy fish	
-- Catching big fish	
Unique fish	.77
-- Catching kinds of fish not often caught in Colorado	
-- Catching kinds of fish not common in Colorado	
-- Catching fish not raised in hatcheries	
Smart fish	.86
-- Outsmarting more experienced fish	
-- Fishing for smarter fish	
-- Pitting your wits against the fish	
-- Fishing where you have to be skilled to catch fish	
Wild setting	.88
-- Seeing few man-made structures	
-- Fishing an area of high scenic beauty	
-- Fishing where you are likely to see only a small number of other fishermen	
-- Fishing where you feel far away from people and cities	
-- Fishing in remote areas	
-- Fishing where you cannot see or hear busy traffic	
-- Fishing where other people are not engaged in other recreational activities	
Fish yield	.80
-- Catching your limit	
-- Catching fish to eat	
-- Fishing where fish are biting regardless of what else you find at the area	
-- Catching as many fish as you can	
-- Catching enough fish for a good meal	
-- Catching fish to store for future needs	
Facilities	.75
-- Fishing at areas where the whole family enjoys recreating	
-- Fishing where boat launches, parking lots, boat rentals, etc., are available	
-- Fishing where you don't have to walk more than 15 minutes	
-- Fishing where campsites, picnic tables, restrooms, etc., are available	

<sup>1</sup> A reliability coefficient is not applicable (NA) for a single-item scale.



Table 2.--Numbers of anglers in actual and predicted fishery choice groups.

Actual Choice	N	Predicted Choice Groups			
		Basic-yield	Wild	Rural	Urban
Basic-yield	260	112 1(43)	59 (23)	49 (19)	40 (15)
Wild	77	13 (17)	59 (77)	3 (4)	2 (2)
Rural	25	6 (24)	1 (4)	10 (40)	8 (32)
Urban	9	0 (0)	0 (0)	1 (11)	8 (89)
Totals	371	131	119	63	58

<sup>1</sup> Figures in parentheses represent row percentages.

defined by the "wild setting" and "facilities" scales, which were found to be equally important as discriminators and provided most of the explanation of variance in area choice. The fisherman group that actually chose the wild type of area to fish placed the greatest importance of any group on the "wild setting" attribute dimension and the least on the "facilities" dimension, while the basic-yield, rural, and urban groups reported progressively lower means on the "wild setting" dimension and progressively higher means on the "facilities" dimension.

The second function included "waters close to work or home" and "novel waters" as attribute preference scales that were nearly equally important as useful discriminators among type choices. The convenience of waters close to work or home was most important to anglers choosing the urban type of recreation area most frequently; it was of decreasing importance to rural and basic-yield user groups, while the wild choice group placed only slight importance on that attribute. No clear trend is reflected by the means obtained with the "novel waters" scale, although fishermen choosing the wild type of area placed a somewhat greater importance on that attribute in comparison with groups choosing other types of areas. "Fast-moving waters" was also an attribute important for discriminating among area choices: a clear trend was reflected in mean scores for this attribute preference scale, with the wild user group placing the greatest importance on it of any group and the basic-yield, rural, and urban choice groups reporting progressively lower means for this attribute.

These results are presented graphically in figure 2, which shows the relative positions of

the four predicted choice groups vis-a-vis the two discriminant functions and the preference scores on which the functions are based. Each point represents a given group's position as reflected by that group's centroid, which was derived by evaluating the discriminant functions at the group means.

## DISCUSSION

Given the complexity and uncertainty of predicting human behavior, the results of the discriminant function analysis are interpreted as disclosing a moderately high degree of consistency between fishermen's choice of type of fishery and their preferences for attributes characterizing each type. With an adjustment for the size of each of the four groups, 25 percent of the members of each group would be correctly classified as actual members of the group by chance alone. (We disregarded any prior probabilities of classifying anglers based on group sizes, which would have masked the association between our independent and dependent variables). In contrast, the predictive model based on the two discriminant functions generally did much better than this random allocation; it correctly classified 77 percent of the anglers in the wild group, 43 percent of the anglers in the basic-yield group, 40 percent of the anglers in the rural group, and 89 percent of the anglers in the urban group. These proportions indicate that the model was most effective in identifying anglers in the wild and urban groups. This result is to be expected, given that these two groups differed the most in their attribute preferences (see table 3, figure 2). The model was less effective in identifying members of the basic-yield and rural groups, although it still significantly increased the accuracy of classification in the case of these groups over that achieved with a random process.

These results provide support for our first hypothesis, suggesting that, when anglers' preferences for specific fishery attributes that are important in a particular choice situation are considered, actual choice behaviors of the anglers do reflect the importance placed on those attributes. Nonetheless, using the square of the canonical correlation coefficient as a rough indicator, at least 60 percent of the variance in area type choice was unassociated with the variance in attribute preferences. This finding is not unexpected, given the possible sources of variance for which we did not account. A number of these sources point to possible limitations of the study. For instance, there may have been critical decision criteria underlying the choice process (e.g., knowledge of available sites) that were not included in the analysis but that would have explained some of the error it revealed. In addition, the methods used to obtain attribute preference ratings were somewhat circuitous and could have caused some instrument bias. A respondent had to first recall numbers of annual trips taken to specific types of sport fisheries

Table 3.--Discriminant analysis of choices of types of fisheries.

Attribute Preference Scales	Mean Scores on Preference Scales by Choice Groups <sup>1</sup>				Discriminant Function Coefficients <sup>2</sup>	
	Wild	Basic- yield	Rural	Urban	Discriminant Function 1	Discriminant Function 2
Wild Setting	5.15 <sup>3</sup> (0.84)	4.17 (1.04)	3.35 (1.16)	3.27 (0.98)	-0.58	
Facilities	2.09 (0.82)	3.12 (1.03)	3.75 (0.88)	3.87 (0.81)	0.58	
Waters close to work or home	2.21 (1.60)	2.65 (1.75)	3.64 (1.85)	5.11 (1.05)		-0.66
Novel Waters	4.06 (1.49)	3.17 (1.48)	3.36 (1.44)	3.22 (0.97)		-0.63
Fast-moving waters	3.30 (1.38)	2.97 (1.54)	2.12 (1.13)	2.11 (0.93)		0.42
Smart Fish	3.50 (1.37)	3.25 (1.32)	2.79 (1.30)	2.89 (1.19)		
Familiar waters	3.31 (1.67)	3.98 (1.50)	4.28 (1.10)	4.33 (1.50)		
Unique fish	3.03 (1.49)	2.50 (1.24)	2.17 (1.15)	2.59 (1.19)		
Trophy fish	3.50 (1.52)	3.48 (1.46)	3.43 (1.42)	3.52 (1.37)		
Fish-yield	3.34 (1.09)	3.35 (1.08)	3.42 (1.20)	3.96 (0.41)		
Percent of variance explained in area choice <sup>4</sup>					33.17	7.39
Percent of variance explained in important ratings					84.32	13.35
Chi-square value					<sup>5</sup> 178.70	<sup>5</sup> 32.39

<sup>1</sup>Choice groups consist of respondents choosing a type of fishery to fish most frequently; mean preference scores are based on a scale ranging from 1 ("Not At All Important") to 6 ("Extremely Important").

<sup>2</sup>Only moderate to large coefficients (>0.40) are listed.

<sup>3</sup>Numbers in parentheses are standard deviations.

<sup>4</sup>Square of the canonical correlation coefficient for that function.

<sup>5</sup>Statistically significant,  $p \leq 0.05$ .

then record that type he/she had visited most frequently, then think specifically of the last trip taken to an area of that type, and finally rate the importance of 32 attribute-related items for choosing to visit that specific area. Choice of a general area type would be only indirectly related to the importance of site attributes for choosing the last area visited, and this link was further attenuated through the structure of the questionnaire. So we might expect some error. If anything, our results suggest that people were reasonably capable in following the instructions of the questionnaire and conscientious in answering the questions it contained.

It is also important to recognize that complete homogeneity of preferences should not be expected for a group of anglers using a given type of fishery. To the contrary, it follows from recent theory on recreation behavior (e.g., Driver and Brown 1978) that, because even recreationists using the same site differ in terms of their experience preferences, differences in preferences for site attributes should also be found. Therefore, although differences in attribute importance ratings

should be greater among the groups frequenting different types of fisheries than they are among anglers within any one group, heterogeneity in the preferences of anglers using a particular type of fishery is to be expected.

Despite the error factor in our results, we believe that they also confirmed our second hypothesis that preferences for both constraining and facilitating attributes influenced the anglers' choices. Perhaps the most interesting findings of the study are suggested by a consideration of the role of specific attribute preferences. For example, the most important discriminating preferences were not ones for attributes of the area that were directly fish-related (e.g., potential number or size of fish that might be caught). Rather, preferences for setting attributes unrelated to fishery characteristics were most important. In fact, when the importance means for fish-related attributes (e.g., trophy fish, fish yield, unique fish, etc.) were compared across choice groups, all of the groups placed similar and fairly high levels of importance on these features, as one might expect of serious fishermen in any setting. The greater

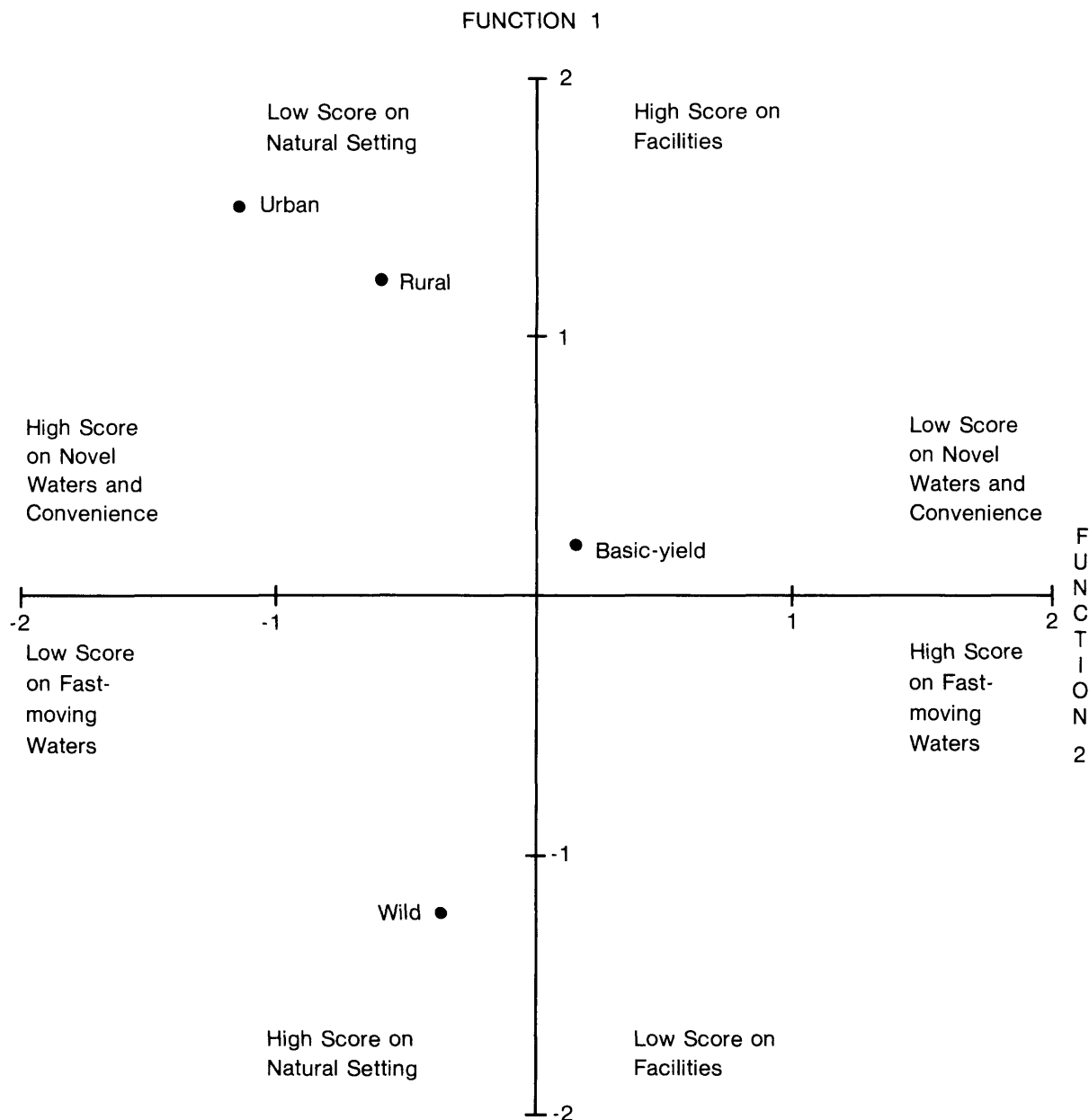


Figure 2.--Relative positions of four predicted fishing groups in relation to two discriminant functions and preference scores upon which the functions were based.

importance of setting variables as discriminators of area choice indicates that site attributes defining the character of the overall recreation experience, and not just fish-related attributes, are important to fishermen.

Further, as theorized in the revised model, the setting attributes considered in the choice process are both constraining and facilitating ones. For example, the most important attributes for choice discrimination included "wild setting" and "facilities". In the case of the group choosing the wild type of fishery to visit most frequently, the "wild setting" attribute was definitely an attractive or

facilitating feature, while the presence of "facilities" might be interpreted (on the basis of its low importance) as a detracting feature of an area in the minds of these fishermen. The convenience of "waters close to work or home" was an important factor in the second function, especially for the urban group whose high importance score on this attribute reflects the constraint that distance from fisheries apparently represents to the group. Also useful as a discriminator was the attribute "novel waters," which was an important facilitating feature to the wild group. (It might be noted that "familiar waters" was more attractive to the groups using the more developed and con-

venient fishery types.) This finding may have particular relevance for efforts to model recreation site demand and evaluate site benefits, which make the basic assumption that, all site attractiveness features being equal, recreationists will choose the site closest to them. The importance of novelty for members of the wild group suggests that they, in particular, might well visit a more distant site for the sake of its novelty, and failure to account for this influence could result in biased estimates of site demand and value.

A conclusion, then, that might be drawn from the study findings concerns efforts to understand the decisionmaking processes of recreationists making site choices. The results of the research suggest that only a small number of area attribute dimensions may be central determinants of site choice, and this finding lends some weight to those proposing that simpler choice rules are appropriate for modeling processes of recreationist decision making (e. g., Krumpe and McLaughlin 1982).

In addition, the study findings indicate the value of measuring preferences for specific area attributes along with preferences for specific types of experiences. However, further research is needed to examine the relationship between recreation experience and site-attribute preferences as well as to more fully describe other elements and relationships influencing recreation decisionmaking processes.

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APPROXIMATING RECREATION SITE CHOICE: THE PREDICTIVE CAPABILITY  
OF A LEXICOGRAPHIC SEMI-ORDER MODEL

Alan E. Watson and Joseph W. Roggenbuck

**ABSTRACT:** The relevancy of a lexicographic semi-order model, as a basis for development of a microcomputer-based decision aid for backcountry hikers, was investigated. In an interactive microcomputer exercise, it was found that a decision aid based upon this model may assist recreationists in reduction of an alternative set to a cognitively manageable number.

INTRODUCTION

In the eastern United States, many Forest Service managers of wilderness areas are reporting heavy and increasing use levels (Roggenbuck and Watson 1981). Managers generally believe that techniques to disperse users within an area or across areas could help reduce congestion, overuse, and perhaps physical impacts (Hendee and others 1978; Roggenbuck and Watson 1981).

Not all Forest Service wilderness area managers in the East report overuse, however. Indeed, reports show several areas have very little use or use at such low levels that impact is negligible (Roggenbuck and Watson 1981).

Alternatives to visiting a National Forest wilderness area often exist. Within a given region, wilderness managed by the National Park Service, Fish and Wildlife Service, some states (for example, Tennessee Pocket Wilderness), and some privately owned and managed backcountry (for example, Grandfather Mountain in North Carolina), and many National Forest, National Park, and State-managed backcountry opportunities are often available. The question becomes: How do we encourage people looking for a primitive outdoor recreation experience to avoid the areas that are currently overused?

Often, decisions are made to visit a geographic region without an actual decision concerning a specific recreation activity site. This is evidenced by the number of visitors entering Forest Service visitor centers and District Ranger

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offices daily to obtain information on primitive recreation opportunities in the immediate area. If information about the full spectrum of opportunities available in a particular area could be presented, recreationists may be able to choose sites that meet their needs outside heavily used wilderness.

DECISION AIDS

Our interest in the research reported here was in providing a framework for development of decision aids for backcountry recreation site selection. These decision aids would most likely be used in a Forest Service district office or visitor center or in a corresponding contact situation of other land management agencies. Currently, brochures and some verbal message from an attendant in a visitor center are typically provided. The same written information is presented to all visitors regardless of reasons for visiting. This often leads to the visitor searching through these materials for personally relevant information. One improvement over the brochure presentation system within the Forest Service is the Recreation Opportunity Guide (ROG) (USDA Forest Service 1979). The ROG is available for the recreationist's use at the visitor center or for use by a receptionist in helping the recreationist decide upon a site for a chosen activity. The ROG for the Pisgah District of the Pisgah National Forest in North Carolina is divided into two loose-leaf notebooks: (1) trails; and (2) all other recreation resources in the district. Within the trails section of the ROG, names of trails are listed alphabetically. Various information is listed for each trail such as length, a mapped location, access points, attractions and considerations, recommended season, amount of use received, difficulty, and change in elevation by distance.

The ROG for trails on the Pisgah district is indexed in four ways. Trails are listed by activity (for example, hiking, skiing, horseback riding); by name (alphabetically); by length (in miles); and by area (planning unit within the district). Using this index, some alternatives can be eliminated based upon location, length of trail, and activity interest. The recreationist must, however, search through an alphabetical listing to obtain additional information on the remaining alternatives.

Another innovative decision aid, tested in a dispersed recreation setting, is the Backcountry Trail Selector (Krumpe and Brown 1982). The Backcountry Trail Selector leads a decision maker

through a series of intermediate choices (for example, a trail along a stream vs. a trail over high passes) to a final choice between alternatives. This decision aid is described as a decision net, usually depicted as a branching tree of successive decision steps. The decision nodes, or branches, represent the individual, intermediate choices, where attributes of possible alternative sites are considered. The branch taken at a node depends on whether or not the level of the attribute under consideration is satisfactory or unsatisfactory.

The need is to examine these two innovations to determine strengths and weaknesses. Decision models evolving from psychology and consumer behavior research offer some insight into how we might build upon these two decision aids. Additionally, microcomputer-visitor interaction systems potentially open new possibilities in construction and application of decision aids. If a theoretically sound method of information presentation were provided, an individual could work interactively with the microcomputer to gain personally relevant information efficiently.

#### DECISION MODELS

A large quantity of decision-related research in recreation is based upon the compensatory approach of the expectancy X valence theory framework (Haas and others 1981; Manfred 1979; Cockrell 1981). This framework suggests that decisions might be best predicted by combining information on attributes (specifically, information on the value of specific outcomes related to the attributes and probability of achieving the specific outcomes) to derive a single evaluative score for each alternative behavior (for example, visits to alternative recreation sites) being considered. Applications of the Fishbein model of expectancy X valence theory also often include a normative component as a further determinant of behavioral intentions (Cockrell 1981).

On the basis of their research, Cockrell (1981) and Krumpe (1979) believe that noncompensatory models may be better at predicting choice in the recreation context (for whatever reason) than previously tested compensatory models. Tversky (1972, p. 298), one noncompensatory theorist, supports this belief by stating that the lexicographic noncompensatory model may be a "good approximation to much more complicated compensatory models" and, in fact, may be "a useful simplification procedure." Compensatory models may be good predictors of choice, but in the recreation context a more simply operationalized approximation may provide better results than past efforts at a very complex task. Normative factors, weightings of importance of attributes, and calculations of value and expectancies are not involved in a noncompensatory model, though their effects may be approximated in a simplified manner.

The noncompensatory models of choice look for alternatives in a decision situation that are satisfactory for all attributes or a particular set of attributes. Alternatives are usually compared on an attribute-by-attribute basis, rather than by comparing an evaluative score as in the compensatory models. In this type of decision model one attribute does not compensate for the lack of another. Rather, if the attribute is not present in sufficient quantity, the alternative is excluded from further consideration.

The lexicographic model calls for a finite ordering of elements (Fishburn 1974). Most notably, the lexicographic semi-order choice model (Luce 1956; Coombs 1964; Tversky 1969; Fishburn 1974) assumes an ordering of the relevant attributes a priori. This ordering is based on importance of the attribute to the decision maker when choosing among alternatives. In this model all alternatives are first compared on the most important attribute. The alternatives judged not satisfactory for this most important attribute are deleted from further consideration. This process continues with those attributes judged to be second, third, fourth, etc., in importance until only one acceptable alternative is left.

Notice use of the term "not satisfactory" in determining which alternative to drop from further consideration. Fishburn (1974) has recognized that in many cases it is not possible to discover a feasible alternative that is "acceptable" or "best" for all criteria or wants. With a lexicographic order in mind, Georgescu-Roegen (1954, p. 518) asserts that "choice aims at satisfying the greatest number of wants starting with the most important and going down the hierarchy. Therefore, choice is determined by the least important want that could be reached."

Fishburn (1974) refers to this process as "satisficing-plus." In this case, one achieves a satisfactory level on as many of the most important criteria as possible, then uses the next most important criteria (for which only one of the remaining alternatives is "satisfactory") to differentiate among the alternatives that are satisfactory for all preceding criteria.

This semi-order model is characterized by Luce (1956) as having a just noticeable difference structure imposed on a lexicographic ordering. Inclusion of the semi-order factor results from research findings which indicate that preference for some values of some attributes is not always transitive (Tversky 1969). Those supporting a compensatory approach seem to believe that values of other attributes might compensate for low values of an important factor. Semi-order lexicographic proponents, however, believe that several values of one attribute may not be "noticeably different," thus are intransitive. Selection may therefore be based on less important attributes though the alternatives differ, but not to a noticeable degree, on a very important one.

Tversky (1969) used the lexicographic semi-order model to study intransitivities in preference. In a laboratory experiment he studied the decision process of subjects who were choosing from college applicants the one they thought should be accepted. Subjects also were asked to indicate preference between simple gambles. Tversky found that the semi-order choice model predicted subject choice better than a model assuming weak stochastic transitivity (the most general probabilistic version of transitivity). Tversky (1969) concluded that when faced with complex multidimensional alternatives, it is extremely difficult to utilize properly all of the available information. Instead, it appears that people may employ various approximation methods that enable them to process the relevant information in making a decision. The lexicographic semi-order choice model may be just such an approximation. It is easy to apply, without complex mathematical computations, and is fairly easily understandable by researchers and those who apply research findings.

As for many decision models that have been proposed in the fields of economics and psychology, there have been relatively few empirical studies of the lexicographic semi-order model of choice (Azumi 1981). Tversky (1972) pointed out that the primary reasons for the lack of such model testing are the difficulties involved in controlling the experiment appropriately and obtaining adequate estimates of choice probabilities.

Selection of the lexicographic semi-order choice model seems, however, justified through a series of smaller, individual research and theory building accomplishments. Evidence supporting use of such a model deals with a subject's ability to make decisions from information presented sequentially. In many cases, subjects have shown a tendency to seek and process information in that manner. The relationship between subject-expressed preferences for attributes and choices made between alternatives has also been explored in a variety of contexts.

Studies that have successfully presented information in a sequential manner to decision makers, or found the subject to use available information in this manner, are varied in purpose and discipline (Olshavsky 1979; Powell 1979; Crow and others 1980; Englander and Tyszka 1980; Herstein 1981; Lowery 1981; Busemeyer 1982). Taken together, although not specifically testing the lexicographic semi-order choice model, they do present data that support the concept of sequential information processing.

The noncompensatory approach, and the lexicographic semi-order model in particular, appears to be a viable alternative to previously used compensatory models in predicting recreationist choice. In developing a decision aid for recreation site selection it is desirable to use a presentation format known to approximate the actual decision process and could, therefore, provide such a format for presentation of information. For these reasons, we selected this model for testing in our research.

## METHODS

Our methodology included a laboratory exercise in which subjects interacted with a microcomputer to collect data. Overnight backpackers, as one of the most common user groups of backcountry, were chosen as the subject population. Fifty members of the local community were selected from response to local appeals for volunteers. Subjects selected had backpacking experience ranging from several years to none (those planning their first trip).

In Task 1, subjects were asked to select from 15 hypothetical backcountry areas (fig. 1) a first, second, and third choice as a place to visit. The purpose of this choice task was to provide a criterion variable on which to evaluate the predictive ability of the lexicographic semi-order choice model. Hypothetical areas were assigned numbers rather than names to avoid preference effects due to the attractiveness of the name. The 15 attributes listed in the same order for each area were those found to be most relevant to participants in a pilot study. The order of presentation of attribute information was randomly generated and assumed to have no significance. Values for the attributes were determined with concern for assuring some conflict. We sought to avoid making any area so attractive that every subject would choose it. Also, the 15 areas needed to be different enough for a single choice to emerge.

Task 2 entailed collection of data via a microcomputer. In an interactive microcomputer exercise developed specifically for this study, each subject ranked the 15 attributes from Task 1 in terms of importance to choosing among alternative backcountry recreation sites. Each subject was next asked to indicate a preference for the values of the attributes in the following manner: "2," category that was most desirable; "1," categories that were acceptable; or "0," categories that were definitely unacceptable. Minimum thresholds of acceptance were established for attributes with at least one value rated "0." Indications of preference of values were obtained for attributes containing a "2" designation. From this information alternatives were eliminated in a sequential application of the lexicographic semi-order model and a final choice predicted.

In the elimination process the experimenter started with each subject's most important attribute and proceeded through the attributes one at a time (fig. 2). All alternatives that exhibited unacceptable values for the most important attribute were eliminated. This process continued with the second, third, etc., most important attributes with the goal of reaching only one alternative. If more than one alternative remained, we then selected as the predicted choice the alternative that possessed the preferred category of the highest ranked attribute, for which no other alternative possessed the preferred category.



ATTRIBUTES	AREAS														
	768	321	457	827	532	886	421	356	439	502	465	633	512	703	644
Number of miles of trail between springs (*no springs)	3	3	7	7	10	4	10	*	5	20	4	12	6	1	13
Probability of finding an isolated campsite	0%	75%	25%	85%	35%	95%	99%	65%	65%	90%	0%	20%	95%	25%	99%
Miles of trail in the area	18	26	36	43	57	4	10	68	95	110	72	10	84	92	40
Permits required to enter the area	Yes	No	No	No	Yes	No	Yes	No	No	No	Yes	No	No	No	No
Campfires allowed in the area	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	No	Yes
Number of wildlife species you would likely see in the area	2	2	6	5	1	22	30	11	8	3	23	4	29	13	9
Number of people who enter each trailhead per day	100+	35	17	11	5	51	62	17	12	2	76	26	27	11	4
Trail configuration (see page 3 for explanation)	1	2	3	1	3	2	1	2	1	2	1	2	3	3	2
Number of people likely to encounter per day	85	45	21	13	3	32	40	16	3	4	100+	50	30	7	0
Campsites assigned in the area	No	No	No	No	No	No	Yes	No	No	Yes	No	Yes	No	No	No
Number of bears seen in the area during last visitor season	3	None	1	4	8	17	6	4	1	None	3	5	1	1	10
Size of area, in acres	1,750	9,500	12000	6,000	9,800	1,100	950	3,750	4,000	16000	4,400	4,500	15000	13000	32000
Camping at designated sites only in the area	No	No	Yes	Yes	No	No	Yes	No	No	Yes	No	Yes	No	Yes	No
Number of overlooks along trails in the area	3	9	13	None	1	1	9	12	None	1	2	29	11	4	9
Probability of vandalism to your vehicle parked at the trailhead	8%	15%	25%	33%	45%	51%	0%	5%	2%	25%	40%	50%	25%	8%	5%

First choice \_\_\_\_\_ Second choice \_\_\_\_\_ Third choice \_\_\_\_\_

Figure 1.--Hypothetical choice situation data presented to a group of backpackers.

PROCEDURE		PREDICTED CHOICE
Step 1:	Eliminate all alternatives which do not possess an acceptable level of the most important attribute. Does only one alternative remain?	----- Yes
	No	
Step 2:	Of the remaining alternatives, eliminate all which do not possess an acceptable level of the second most important attribute. Does only one alternative remain?	----- Yes
	No	
Step 3:	Proceed through the list of attributes in decreasing order of importance, eliminating alternatives as in Steps 1 and 2. Does only one alternative remain after consideration of any one attribute?	----- Yes
	No	
Step 4:	Eliminate all remaining alternatives which do not possess the preferred value of the most important attribute. Does only one alternative remain?	----- Yes
	No	
Step 5:	Eliminate all alternatives which do not possess the preferred value of the second most important attribute. Does only one alternative remain?	----- Yes
	No	
Step 6:	Proceed through the list of attributes in decreasing order of importance, eliminating alternatives as in Steps 4 and 5 until a final choice can be predicted.	

Figure 2.--Flow chart of the lexicographic semiorder choice model tested in a study with 50 backpackers.

## RESULTS

In 48 of the 50 cases, a clear choice was predicted from information collected through the micro-computer exercise. In only two cases could no clear "winner" be predicted. In 27 cases (54 percent), the predicted choice matched the subject's actual choice. The predictive success of this noncompensatory model is difficult to compare directly with past tests of compensatory approaches in the recreation context. In one of the most recent applications of the Fishbein model, however, Cockrell (1981) reported nonsignificant R-squares in five of six regression equations used for prediction. Elements of the regression equations included attitudes and norms toward various alternative areas. The lack of significant R-squares was interpreted by Cockrell to be an indication of little predictive success. He concluded that a river runner's intentions to participate in a river trip are not determined by the person's attitudes toward the trip and his social norms about the trip.

Although the choice prediction capability of the lexicographic semi-order model is substantial, the model's ability to predict elimination of alternatives is even more noteworthy. In 72 percent of the cases in our study, the prediction process successfully eliminated twelve of the 15 alternatives, leaving a set of three alternatives, one of which was the subject's first choice. This figure increased to 86 percent for deriving a set of five areas that contained the subject's first choice.

The area selected as the first choice by the subject in Task 1 and which served as the criterion measure for evaluating the predictive capability of the lexicographic semi-order choice model may not have been the individual's "best" choice. Recall that Task 1 was a written exercise that required the subject to name a first, second, and third choice among 15 hypothetical backcountry areas. Information on 15 attributes for each of these 15 areas was presented to the subject in tabular form. This task, designed as it was to assure some conflict in decision making, may have been so difficult that the "best" decision was not made. If this occurred, then the predictive capability of the model may be underestimated. The predictive capability may have been better had fewer areas, fewer attributes, or a different method of presenting the attribute information been used in determining the criterion measure.

It is possible, however, that the procedure used to identify the criterion measure may have increased the likelihood of a valid selection of a "best" choice. The researcher communicated instructions to the subjects orally, only one subject at a time was processed, and the subject was aware that the general goal of the study was to find out how people make decisions about where to go on recreation visits. A subject making a decision in this context may have attempted to very carefully process every item of information available. Such processing may, in fact, be more complete than in a real situation without oral instructions

and knowledge of the purpose to which responses were to be applied.

## CONCLUSIONS

The lexicographic semi-order choice model used in this study did not approximate the backcountry site selection decision process closely enough to select a final choice for all users. Our findings do, however, suggest that a decision aid based upon this model could assist a recreationist in reducing a set of alternative site choices to a manageable number. Efforts to develop such an aid, which would assist the user in determining a viable alternative set containing three to five alternatives, would provide a great service to the user and be justified.

One possible immediate application of these findings would be to develop a microcomputer-based decision aid built upon the principles of the lexicographic semi-order model for use on a Forest Service District to supplement current information and education efforts. This decision aid could improve information dissemination programs while it collected some very useful information for the manager. Information that could be recorded would include what attributes must meet minimum thresholds for acceptance, what these threshold levels are, and finally, given this information, what specific areas decision aid users decide to visit.

Needed additional research would include the opportunity to compare the site chosen from the decision aid exercise to the actual site visited. These data could be collected observationally and would be a desirable follow-up test on the usefulness of such a decision aid. Another research need is to manipulate data considered in the decision process to test for resultant changes in choice behavior. Both of these suggestions arise from the need to demonstrate that recreationists can and will use such a decision aid, and that the content and manner of presentation of the information supplied produces enough confidence in the decision that the chosen area is actually visited.

The empirical support of the lexicographic semi-order choice model provides a basis for analysis of the Recreation Opportunity Guide and the Backcountry Trail Selector as decision aids. An obvious weakness of the ROG is the lack of adaptability to the individual. The lack of desirability of a few fixed indexing items is reinforced by examination of the variations in the rankings of attributes in this study. Many different attributes and areas were indicated as top choices by study participants. It therefore seems erroneous to assume that miles of trail, name of area, and planning unit location are relevant or important attributes for every user of the ROG. Without indexing by relevant variables, the individual user of a ROG must leaf through every page to search out a destination. This is exactly the type of overwhelming information (often leading to unsatisfactory choices) that any decision aid should be trying to minimize.

The method of presentation of information using the Backcountry Trail Selector has the same weakness--lack of adaptability to the needs of the individual user. By forcing every individual to consider the same attribute first, we are assuming that the attribute is not only a relevant one, but the most important one for all users.

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## WHY HERE AND NOT THERE:

### THE CONDITIONAL NATURE OF RECREATION CHOICE

Roger N. Clark and Kent B. Downing

**ABSTRACT:** This paper reports results of several studies to identify the state of the art and direction of research on how recreationists make choices. Findings from the studies have been combined into a list of propositions; the propositions can be considered hypotheses from which future studies can be developed or the effect of management activities on choices can be evaluated. Concepts that underlie recreation choices are illustrated. The complex and diverse nature of the recreationists' decision making process supports a grounded approach in future investigations.

#### INTRODUCTION

How people make decisions about when and where to recreate has become a topic of increasing interest in the past few years (Brown and Ross 1982; Knopp and Leatherberry 1982; Krumpke and McLaughlin 1982; McDonough 1982; Stynes 1982; Watson 1983). The new focus is evident in both recreation research and management. In research, studies have evolved from those that describe recreation events and users to those that focus on why the events observed occur. The focus on recreationist's decision making (a process orientation) has been a logical outcome of this progression.

For managers, understanding the process of making recreation choices is extremely important for two reasons: (1) to recognize when and how integrated resource management activities (in recreation, timber, minerals, range, engineering, wildlife, hydrology, cultural resources, and so on) impact specific kinds of recreation opportunities, in positive and negative ways; and (2) to recognize when specific recreation goals and objectives can be achieved without unnecessarily constraining the management of other resources.

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Identification and evaluation of effects of resource management, as well as other, more general social changes, have become important areas of concern. Recreationists make their own decisions, managers do not make decisions for the recreationists. But managers' actions affect the places recreationists go. An understanding of the process people go through, as well as the factors they consider, will facilitate the judgmental process managers must apply in matching supply with demand and protecting the integrity of quality recreation opportunities.

The purpose of this paper is to report results of several recent studies in the West and Alaska to identify the state of the art and direction of research in the area of choice behavior. Concepts that underlie recreation choices, and how they can be related to management as well as research, are illustrated.

#### VARIED RESEARCH PERSPECTIVES

Investigators have followed divergent pathways in pursuit of knowledge about recreation behavior. Knopp and Leatherberry (1982) observe that in assessing "how individuals choose an activity and place, the primary emphasis has been on motivational factors often referred to as needs, desires, reasons or similar terms. Some researchers have included what can be called intervening factors, for example, cost, distance, access, knowledge. Unfortunately, in failing in our research to account for experience and the tendency for people to tire of an activity and drop it to take up new pastimes, we obtain a static view of decision making." Similarly, variation in the patterns of use associated with different places displays dynamic qualities of choice behavior as well--discovery of places, attachment to favorite ones, repeat visitation, relocation as sites change in undesirable ways, and so forth (Downing 1982). Only recently do we seem to be looking into the dynamic dimensions of recreation choice. But, how do we represent the dynamic nature of recreational choice phenomena; in particular how do we express the balancing of conflicting desires?

Propst and Lime (1982) observe that recreation researchers have most often looked to other disciplines for help in solving conceptual problems. They cite efforts at applying economic and job satisfaction models to recreation satisfaction,

but suggest that the results have been mixed. Another investigator has recently proposed applying a variation of a noncompensatory model as a "simplified approximation of whatever the complex cognitive decision process might actually be" (Watson 1983). Indeed, what might it actually be? We persist in efforts to fit our data to existing theoretical perspectives, many of which are themselves in need of further elaboration and refinement in the substantive area from which they were initially derived. Most of these models have their critics.

#### DEVELOPING A GROUNDED CONCEPTUAL APPROACH

A review of the literature indicated that both the research methods currently being used and the various theoretical perspectives discussed have not fully explained the complex nature of the choices inherent in the data described in this paper. Most past work seemed to lack a behavioral basis. So we turned to Glaser and Strauss (1967) for developing a "grounded approach" to explain the choices observed and reported in our investigations. Glaser and Strauss (1967) and Schatzman and Strauss (1973) state that a grounded approach may be of greater assistance, at least initially, in representing the theoretical complexity in a substantive area of inquiry. They advocate entering the field with minimal commitment to an existing theoretical model; a model can then be derived inductively to conform to the richness, diversity, discrepancies, and apparent inconsistencies in data encountered.

In many respects, the grounded theory guided the design of studies discussed later in this paper. In general, our research progressed from using qualitative to quantitative methods then back again to qualitative where appropriate. Each approach offers a different level of resolution about how recreationists make decisions. This issue is discussed more fully by Downing and Clark in this proceedings.

#### FACTORS OF RECREATION CHOICE

Within the context of a given outing at a specific time, people frequently are faced with diverse and often conflicting choices, choices that require trade-offs among competing desires. When deciding whether to go on an outing, participants must make many decisions that are conditional on many, often interrelated factors. Types of decisions to be made and factors to be considered are shown in table 1. Although many of the factors have been described in previous studies, the pattern of interrelationships between the choices and kinds of factors has not been described. The items shown are not necessarily exhaustive nor are they listed in any order of priority. Most of them are discussed later in this paper.

Table 1.--Types of decisions to be made and factors that often weigh in recreation choices

Decisions	Factors
Go versus do not go	Information and knowledge
With whom: Primary group Alone Others	Individual considerations: Time/money available Desire for change Limitations/handicaps
Where: Specific geographic area Macrosite characteristics	Group considerations: Primary group Secondary group Competition from others
To do what: Single or multiple activities Desires of individual or group	Activity considerations: Equipment available Season
How: Mode of travel Style of activity	Place considerations: Weather/seasons (may impede/facilitate) Opportunities there Natural attractions
When: Time of day, week Season	Management considerations: Rules/regulations Facilities provided Perceived safety
Why: Satisfactions desired Needs, motives Preferences, etc.	

When people reach the site of their choice, they may re-evaluate many of their prior decisions. As a consequence, the individual or group may adapt as necessary to match expectations with realizations encountered on site. Thus, the decisions and factors shown in table 1 must be viewed in a dynamic and probabilistic rather than deterministic way.

The requirements for decisions--evidence of diverse mediating factors in decision making--have been referenced by other authors (Anderson and Brown 1984; Harvey 1976; Krumpke and McLaughlin 1982; Peterson 1974; Young and Smith 1979). This perspective gives rise to a number of questions about places, people, management activities, users' decision processes, and the structure of interrelationships among the decision factors shown in table 1. A variety of such questions is given in the paper by Downing and Clark.

#### WHAT WAS FOUND

Three studies provide the basis from which we derive a series of propositions related to the decision process. The studies were located in Alaska, Washington, Oregon, and Utah and used various methods for data collection. The study in the Pacific Northwest (Oregon and Washington) used on-site participant observation, a questionnaire, and interviews in roaded, dispersed areas (Clark and others 1984). The Alaska study used an in-home interview with residents and focused on their perceptions and use of natural resources. The study represented the views of non-users as well as users (Clark and others 1982). The Utah study was also conducted on-site but used naturalistic inquiry (ethnography) in developed and undeveloped areas (Downing 1982).

Each of the studies focused in one way or another on aspects of recreational choice behavior. The studies in the Pacific Northwest and Utah intended to explain why people chose the areas in which they were found. The Alaska study determined specifically where people went from their residence and which of the places identified (on a map) were their favorite or most often visited, and what similar place they would use if the favorite was somehow changed in an undesirable way. In this study, respondents were also asked what would be the consequence of resource management activities, such as logging, on their favorite place, that is, would the changes make the place more or less desirable, and if less desirable, would they stop going there.

A grounded approach, as described by Glaser and Strauss (1967), and an ecological perspective (McDonough 1982; Propst and Lime 1982) have been adopted in an attempt to put into perspective past research findings. Findings and conclusions from the three studies were combined and are summarized below as propositions. They may be considered hypotheses from which management implications and research studies can be developed. Later we discuss the structure or pattern of relationships among the decision factors that affect how people make choices.

#### Propositions About People

- Most visits are in groups (friends, family, multiple-families, peer groups, etc.)
- The group one recreates with plays a major role in choice behavior (Cheek and others 1976). Most studies document that few people recreate alone, even in Wilderness (Hendee and others 1978). So the process of negotiation between members of the primary group must be evaluated; yet most studies focus on individual desires and behavior, an orientation that does great injustice to the reality of decision making. The decision process includes individual and group past experiences that must somehow be melded into a satisfactory solution. Data from these studies did not document the differential "power" each person in the group possessed, but numerous responses, particularly in the Pacific Northwest and Utah studies, revealed that this phenomenon plays an important role in final decisions. Future studies should allow researchers to distinguish between "the recreationist as an individual" and "the recreationist as a group member" (whether the party head, peer, or subordinate). Perhaps some of the methods and concepts of behavioral sociologists and psychologists might be utilized to evaluate this exchange process.

#### User characteristics

- Group composition may be fluid with members arriving and departing at different times.
- Members may engage in the same activity as a group; at other times, individuals and subgroups engage in separate, and occasionally, widely disparate activities.
- It is common to observe variation in style of outing within a group (for example, some may camp in tents of different style, whereas others stay in pickup campers or recreation vehicles).
- Not all needs or preferences of individuals within the group may be met; trade-offs and accommodations must be made at times. The group may require compromise and consensus, or submission to some of the desires of its members.

#### Attachment to place

- Recreationists form attachments to sites and return to favorite or preferred places again and again (Knopf 1983).
- They tend to use places similar to those used as children.
- They visit other "acceptable" places for similar outings as well. Occasionally visitors use sites with attributes they rate as "undesirable" or "unacceptable," although these conditions do not preclude engagement in the chosen activity with the chosen group.
- They tend to travel within a well-defined area ("home range"), generally no more than 2-4 hours for people using roaded forest areas and boats in coastal areas.
- They may decide where to live based on the availability of desirable places and opportunities for activities.

#### Preferences for setting

- Recreationists include individuals who prefer developed sites, those who prefer dispersed sites, and those who have no preference and use both types of setting.
- They will, under certain circumstances, switch from dispersed to developed settings and vice versa in apparent contradiction to stated preferences.
- Dispersed area users take advantage of opportunities in primitive and semi-primitive settings by bringing their own equipment to provide the creature comforts found in developed campgrounds.

- Developed sites are chosen for convenience and safety, dispersed places for freedom and lack of regimentation.
- Both dispersed and developed sites offer opportunities for socializing with others not in the party or for privacy, depending on site selection and timing of visits.
- Water, whether in lakes, streams, or marine locations, is an important component in making choices (Clark and others 1984; Lime 1971; Lucas 1964).

#### Adaptability

- Forest recreationists may be temporarily or permanently displaced from places that change in unacceptable ways.
- Displacement may be of a "conditional" nature; that is, recreationists may return under special circumstances.
- Forest recreationists appear to vary in their "threshold of disruption" and in their willingness to adapt to undesirable changes in a place. Expectations and the availability of alternatives are key elements in understanding how thresholds operate to change patterns of actual use.
- They vary in their willingness to explore new and unknown territory, particularly outside the bounds of the home range.

#### Propositions About Activities

In each of the studies, there were few activities in which there were no participants, even though the environmental conditions ranged from developed campgrounds to wilderness.

- A variety of activities occurs on each outing, which leads to diverse experiences and satisfactions.
- Activities may include all or part of the primary group and any other people who join together at the site. Activities range from very active to very passive and span a wide geographical frontier in relation to the prime site that the group visits.
- The same activity may take on different styles. People can participate in the same activity in a variety of ways and in many different places ranging from city parks to wilderness. An activity such as hiking, for example, is basically the same in each area, but the motives for engaging in the activity, the style of participation, and the resulting experiences can vary dramatically from one area to another (Clark and Stankey 1979).

#### Propositions About Places

- Attributes of a place can attract or detract and can facilitate or constrain a specific activity.

Place is a major element that composes a recreation outing and that must be evaluated in individual and group decisions. Several features of place have been identified in the Recreation Opportunity Spectrum (ROS) for example, including physical and biological factors, man-made factors, and social features (Brown and others 1978; Clark and Stankey 1979). Studies reported in this paper indicate that each of these features may or may not play a role in the decision making process. Place may be evaluated at macrosite or microsite levels. One level or the other may take precedence at different times and for different individuals in the primary group. One person's favorite may be another's least desirable place to go.

- Users of dispersed and developed sites are found in dispersed and developed settings (different microsites) located in geographic proximity along paved highways and gravel roads in forests, near settled areas, and in more remote regions.
- At a macrosite level, the place may be acceptable to users of dispersed and developed sites, whereas preferences at the microsite level may differ substantially.
- Users of dispersed and developed sites frequently travel into dispersed areas for day use activities.
- Acceptability of macrosites and microsites varies by season (for example, a place may be acceptable for an individual or group for hunting in the fall and cross-country skiing in winter but not as a dispersed or developed site for family camping in the summer).

#### Propositions About Management

- Few visitors to a roaded forest learn about the place through information supplied by the agency. Informal personal contacts, most often family and friends, are the most important source of information about opportunities.
- Lack of developed campgrounds is infrequently a reason users give for choosing dispersed sites. Dispersed and developed settings are not substitutes one for the other.
- User acceptance of management practices varies (Downing and Clark 1979).
- Users of roaded recreation settings, in contrast to primitive settings, are less likely to be annoyed by common management activities such as logging and grazing. The size of clearcuts, and their location relative to campsites, however, is important.

- Users support road closures for some management purposes (to protect wildlife, for example), but have less support for others (to save limited maintenance money, for example).
- Many visitors in Pacific Northwest forests express strong support for agency presence, ranger patrols specifically.
- Visitors value unchanging settings. For example, visitors in the Pacific Northwest indicated that opening areas for dispersed recreation is a good reason for building new roads, but not in the area which they were in at the time.
- Acceptability of visitor impacts varies. Some recreationists express little concern about litter and garbage, fires, noise, vandalism and theft. Others, however, have relocated (have been displaced) from settings where these problems have been present.

#### Propositions About Recreationists' Decisions

#### General characteristics of choice

- Recreationists may choose a particular place for a given outing for a variety of reasons:
  - (1) habit, tradition;
  - (2) a desire to be in a place of expected stability, reliability, familiarity in a changing world (Iso-Ahola 1980);
  - (3) a desire for psychological distance--to be far enough away to feel like they have gotten away;
  - (4) to explore for new and unknown territory; or
  - (5) to accommodate to particular needs and constraints of a trip (mediating factors): special needs of the group, time constraints, and cost constraints (Cheek and Burch 1976; Kelly 1976; McDonough 1982).

#### Specific characteristics of choice

- Access is a key determinant influencing recreation choices and the location and amount of use. Of all the management factors identified by Clark and Stankey (1979) in the ROS, access probably plays the most critical role in either facilitating or constraining recreational use. Whether one chooses the term "facilitating" or "constraining" to describe access conditions depends on a personal point of view.
- Favorite sites are frequently more remote and possess desired land characteristics. Conversely, most-visited places are usually more accessible, more convenient, and provide particular activities and facilities.
- Both dispersed and developed sites may be selected for separation, remoteness, and isolation from others not in the group.

- Dispersed sites are often chosen over developed sites because they can better accommodate needs of large groups.
- Dispersed settings offer privacy, freedom to engage in activities not allowed in developed sites, freedom to adapt the place to the particular "style" of the group.
- Users of dispersed and developed sites have stopped visiting (have been displaced from) formerly used dispersed and developed sites because:

- (1) settings have changed in undesirable ways;
- (2) too many people are there;
- (3) number of undesirable people (people who are not considerate of others and do not know how to behave) has increased;
- (4) resource management activities have increased;
- (5) more preferred places have been found; or
- (6) life circumstances have changed (for example, places that supported the needs and desires of a family with children are not as desirable after the children grow older or leave the parents).

#### At the macrosite level

- Once pretrip considerations are settled (such as group needs, trip constraints, desire for change of place), recreationists evaluate and make choices among options (Watson 1983) in terms of the following attributes of a setting:

(1) variety of physiographic, topographic, and landscape features (Haas 1979);

(2) season and elevation;

(3) remoteness from home (psychological distance--far enough to feel like getting away) and from centers of population;

(4) variety of resource-dependent opportunities available; and

(5) ROS conditions (ranging from primitive conditions and settings to developed areas with roads and facilities).

#### At the microsite level

- Many of the options applicable to the macrosite level also apply to the microsite level.
- Choices may be changed upon arrival depending on the availability of sites (favorite, preferred, or otherwise) as well as activities planned and special desires of the group.



### Predictability of choices

• The process of making choices is inherently complex, and prediction is exceedingly difficult with present knowledge.

(1) Choice of place (at both the microsite and macrosite level) is difficult to predict for a given type of outing without understanding circumstances about the trip (Knopp and Leatherberry 1982; Krumpke and McLaughlin 1982).

(2) The likelihood of disruption at favorite sites (to determine the threshold of disruption) is difficult to predict from users' statements of preference.

(3) Although the process is difficult to predict, trade-offs people make may not be terribly stressful.

• Although favorite sites would be less attractive with certain changes (clearcuts, new houses or buildings, new logging, mine tailings, new roads, log storage), not everyone would stop going to their favorite place if such changes would occur.

• A variety of situational (mediating) factors limit freedom of choice (for example, distance to alternative sites, cost of fuel, travel time). Places subsequently chosen to accommodate the outing and regarded as "acceptable" may otherwise be rated as "unacceptable" (Schreyer and Roggenbuck 1981).

• Expectations are important in recreationists' decision making. They serve as filters to narrow the range of activities and places that will be considered for a particular outing with a particular group. They are employed during pretrip planning for weighing anticipated trade-offs among alternative possibilities of group composition, activity or experience, and place. How satisfied one is with a particular trip or activity depends in part on how well pretrip expectations match actual outcomes (Roggenbuck and Schreyer 1977).

### DISCUSSION

It was difficult to determine the sequence in which the various decision factors shown in table 1 enter recreationists' decision process. Obviously there is great variability between individuals and between one trip and another as to what circumstances are most important.

A variety of factors that influence recreation choice behavior may operate independently at times and interact in complex ways at other times. The content (decision factors) and structure (relationships among factors) of the decision process are of primary interest and must be represented in a holistic way. Numerous studies on recreation behavior are not referenced in this

paper; most did not deal directly with the behavioral choices of recreationists in real-life situations. Future work will be directed at integrating the results from these investigations.

Grounded perspectives about recreational choice behavior are important theoretically and are relevant to managers. Some particularly important concepts follow.

### Home Range

For a given outing, people choose among options about place or decide to discontinue visiting certain sites within a bounded geographic area or "home range"--an area judged appropriate to a particular group, activity, or experience. Home range for recreationists visiting roaded, forested areas of Oregon, Washington, and Utah for 2-3 days duration is within 2-3 hours drive of home. The same time frame tends to hold in southeast Alaska as well, but boats rather than wheeled vehicles are the main mode of travel. Some people are more "migratory" in nature than others (they act like tourists) and go beyond the bounds of the home range as defined by the majority of recreationists. But they appear to be more the exception than the rule.

Home range seems to be an important concept. It suggests that there is a more-or-less geographically bounded and behaviorally relevant area within which most trade-offs among settings for a given type of activity or experience are made. The home range contains sites judged by people as "favorite," "most often visited," "acceptable" alternatives, and "unacceptable" places once visited but visited no longer.

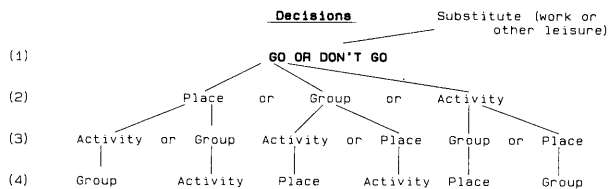
The size of home range may vary for different activities, different modes of travel, and different regions of the country. In southeast Alaska, for example, mode of travel and availability of a range of recreation opportunities closely related to local communities explains why most use is within 25 miles of home. For Anchorage, on the other hand, most recreation opportunities are further from town, and competition for them increases. The amount of time and distance traveled are greater, yet are still within generally predictable limits. The practical significance is that if people do associate a particular travel time and maximum distance with a particular type of activity or experience, "home range" should be incorporated into assessing the relative availability of and demand for different types of place-related opportunities. The activities and experiences possible become the "browse" within the home range. To the extent that resource managers control the basic factors that determine browse available to recreationists within their home ranges, understanding the relationship between available opportunities and use will be important in predicting consequences of resource management options for the public.

## Considerations for Modeling Choice Behavior

We have not developed a detailed model of the decision process, but we can suggest some concepts that need to be integrated into a comprehensive model.

The choice process seems to work under two general conditions: the "initial condition" and the "adaptive condition" (fig. 1). The initial condition is where the participants essentially are exploring "new ground" with regard to recreation events. The adaptive condition is where the participants have prior experience and are evaluating whether or not to repeat an event at a particular place with a specified group. It is within these two conditions that concepts such as substitutability and ultimate trip satisfaction for each member of the group begin to make sense.

### A. Decision level



### B. Decision level

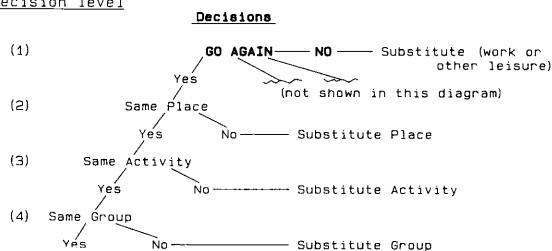


Figure 1.--Conditions in the recreation choice process: A, Initial condition; B, Adaptive condition.

When making the initial decision, a recreationist must consider group, place, and activity. The first choice likely limits or constrains subsequent choices (a filtering process). What decision comes first--about place, people, or activity--likely varies from outing to outing and from individual to individual. Moreover, these early choices determine which macrosite and microsite factors in the ROS are likely to be salient in final selection of place. Other personal or group constraints may become considerations as well and may dominate from the beginning of the decision process. Thus, it is not always possible to select the macrosite and microsite based on individual preferences for attributes of a particular setting.

When considering whether or not to repeat a trip, the recreationist can adapt as a result of prior experience or because of new decision factors. Substitution can then occur at any of the four levels shown in figure 1B. Not only can a recreationist substitute a place, but he or she can also substitute one activity or group for another. When the same combination of decisions is made time after time--that is, the same group goes to the same place to do the same sort of activity, often at the same time of year--the event becomes traditional.

## CONCLUSIONS

The decision process for making recreation choices is complex from a research perspective: final decisions are conditional on interaction between people and places with a variety of mediating influences. The process is dynamic with new information continually affecting what people do as well as why they do so.

Preferences are not necessarily equal to actual choices--at least not some of the time and not for some things. This is really not surprising. We must deal with group preferences versus individual preferences. "My favorite" and "our favorite" may not be the same. People in different groups may do the same or different things for the same or different reasons. What "appears to be" may be very different than what "really is." Understanding some of the "why" underlying recreationists' choices will facilitate programs that will provide the range of conditions acceptable to the public.

The focus on place is fundamental, particularly when viewed within the context of home range; it both facilitates and constrains groups and activities. It provides the palette, or array of options, from which people create their own images. People have favorite places; they visit them and can identify attributes associated with those places. People also have favorite activities and people with whom they recreate; however, people often choose other than their favorites. Perhaps only seldom do all favorites (place, people, and activity) overlap (fig. 2). The studies discussed earlier indicate, however, that such apparent "inconsistencies" are rational. Whether they choose other-than-favorite places, activities, or people because of a desire for diversity or because of constraints, recreationists, nonetheless, may have a satisfying time. Choices about a setting might be viewed as "rational" for a given outing but vary from party to party and from trip to trip. Rationality is indicated by the evaluation and eventual selection of places expected to adequately accommodate the fluid nature of arrival and departure times of group members, group needs for activity and space, varying tastes of individuals within the group, and constraints of the particular situation. Evidence of such considerations is common in users' explanations of why they are "here" rather than "there."

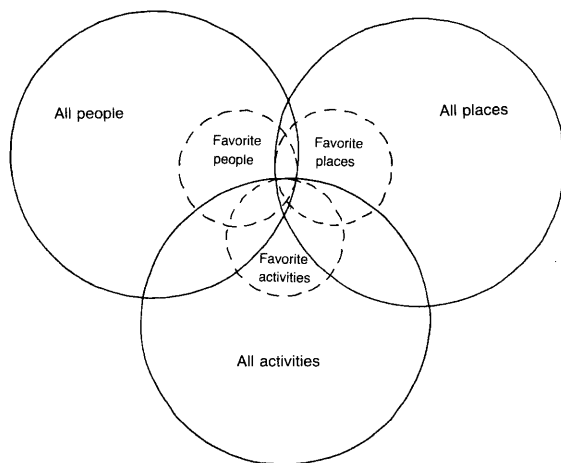


Figure 2.--Relationships between favorite people, favorite place, and favorite activity.

People generally compromise in making recreation choices. They weigh individual versus collective considerations, plus other constraints and opportunities, in reaching a decision. At the group decision making level, there may, in fact, be a close match between preference and behavior. Looking at preferences at the individual level may be appropriate to show the range of possibilities, but may not be a good predictor of actual behavior.

We must conclude that recreationists (at least some members of a group) are often able to achieve satisfactory trip experiences in what they would otherwise regard as a marginally acceptable setting. Under such circumstances, it appears that attributes of a setting support, albeit minimally, the desires of the group regarding activity or experience. When users expect less than an ideal place, going there must be valued more than not going. Anticipated satisfactions of a trip are largely dependent on engaging in desired activities with a desired group. An "optimal" setting is not always required or, alternatively, the requirements of an optimal setting may be quite minimal. Places must then be judged for the degree to which they adequately support activity, experience, and group needs. It may not be possible to label a setting as "optimal" in abstract terms. This may help explain why favorite places are not necessarily the same as those used most frequently for a given kind of outing, and why people often use settings with attributes they regard as somewhat undesirable.

The concepts of "home range" and "browse" seem to apply to recreation as well as to wildlife. People seek diversity and may go to a variety of places, assuming they have knowledge of opportunities available, but generally do so in a confined territory, at least at the aggregate level. They can choose the same browse (experiences and satisfactions) in the same or different place, or go routinely to the same place for different browse.

Past attempts to simplify the methodology and substance of the recreation decision making process have done injustice to the topic. Little is known at present about choice behavior that can be generalized with any degree of reliability. The fact that researchers from diverse disciplines have converged on the matter of recreation choice is comforting; the lack of an integrating perspective is not. The results from this symposium may lead us in a more productive direction.

#### RESEARCH NEEDS

Additional investigations based on a grounded, behavioral approach are needed to ensure that researchers are working with relevant elements and relationships. Verification through further data processing can then follow for data sets which clearly reflect the idiosyncrasies of the recreation choice process. Research has begun to demonstrate the complexity involved, but more studies should be conducted within a holistic, ecological framework.

There is a need to integrate research methods, models, and concepts. Multidisciplinary studies are also required to understand the complex nature of the recreation choice process. The move from descriptive to explanative studies will necessitate using alternative research designs--longitudinal and experimental--and strategies to collect a mix of quantitative and qualitative data.

There is need to refine the home range concept and to describe the nature and extent of home ranges for different kinds of groups, activities, and experiences. What are the constraints or factors that shape home ranges? Moreover, there is need to determine which of the interrelationships between place, activity, and group are most significant to recreationists' choices, and to determine which management activities are most likely to influence recreationists' choices. Research must focus more on the group, rather than the individual, largely because decisions are typically made within the group unit.

And last, researchers need to know more about what really matters versus what is nice to know but irrelevant for effective management. Determining this balance requires on-going cooperation between researchers and managers.

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## EVALUATING USER IMPACTS AND MANAGEMENT CONTROLS:

### IMPLICATIONS FOR RECREATION CHOICE BEHAVIOR

Harriet H. Christensen and Nanette J. Davis

**ABSTRACT:** This paper describes potential factors affecting recreation choice behavior. Freedom and lack of constraints are experiences frequently sought by recreationists. Data in the paper are based on questionnaires completed by agency managers and informal conversations with users in the Mount Rainier area of Washington State. Managers' and users' perceptions of impacts such as vandalism, theft and littering, and social control practices are described for developed and semi-developed campgrounds. A framework illustrates the recursive nature of deviance and social control. Implications of impacts and regimentation practices for influencing choice of recreation settings are discussed.

#### INTRODUCTION

Demand for recreation opportunities in natural settings continues to grow. Recreation use on National Forest lands during fiscal year 1983 numbered 228 million recreation visitor days; 78 percent of this use occurred in the western States and Alaska (U.S. Department of Agriculture, Forest Service 1984). Only one-third of this use is in improved locations; the remainder is found throughout undeveloped forest lands. At these areas, users can view wildlife, sightsee, camp, hike, picnic, hunt, fish, ride horseback, canoe, raft, ride off-road vehicles, and take part in many other outdoor activities. These opportunities are found throughout the 191 million acres of National Forest land, 87 percent of which is located in the West, and on other public lands, also located primarily in western States.

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Several studies have addressed the kinds of experiences people desire in natural environs--wilderness use, Hendee and others 1978; snowmobile use, McLaughlin and Paradise 1980; river running, Schreyer and Roggenbuck 1978; off-road vehicle use, Watson and others 1980; developed camping, Clark and others 1971; and dispersed use, Clark and others 1984. Satisfactions expected by users include experiencing natural environs that are largely unaltered by human use, feeling free and independent, and escaping adverse conditions such as noise, unsafe areas, and pollution. (For an extensive discussion on motives and experiences desired, see Knopf 1983).

Recreation choice behavior in this paper refers to factors that may influence recreationist's decision making and choice of recreation setting. The issue of recreation choices has become more important. We have reached a turning point in recreation management because of increased use and the need for more astute management practices to deal with the many problems of congestion, vandalism, and reduced budgets of forest management. What needs to be known is how people make choices and to what degree impacts and regimentation affect those choices.

This paper has three objectives: (1) to identify user impacts, such as vandalism and theft, and to discuss possible influences they have on recreation choices users make, (2) to identify the possible negative effects of social control and regimentation on user choice behavior, and (3) to propose a theoretical model for future empirical research. Specifically, we will discuss managers' and users' perceptions of impacts; for example, illegal entry of personal vehicles, a stolen camp stove or sleeping bag, and other depreciative behaviors. Second, we will look at users' and managers' perceptions of regimentation, such as enforcement practices. Finally, we will present a control model that summarizes the recursive nature of depreciative behavior in some instances, and how impacts and control practices can produce unanticipated results in terms of possible effects on recreation choice behavior.

Throughout the paper we draw on the Recreation Opportunity Spectrum model (ROS). Inherent in the ROS is the assumption that opportunities include activities such as camping and hiking; settings that encompass physical, social, and managerial environments; experiences such as freedom, solitude, adventure, and socializing with people; and benefits such as improved health. The ROS model posits that a wide range of choices is available to users with multiple types of activities and experiences possible. Two elements of the opportunity spectrum--level of visitor impacts and level of regimentation--will be used in this paper to speculate on how users define available recreation choices (Clark and Stankey 1979, Driver and Brown 1978).

#### VALUES, IMPACTS, AND SOCIAL CONTROL

Available findings on users' expectations reveal a variety of values. As regimentation increases, we, in research, increasingly need to consider freedom, quality experience, and security (or absence of victimization) as crucial values in the outdoor experience. Quality experiences are expected by users in the outdoor environs. Recreational enjoyment as an aspect of quality entails an absence of threats from vandalism, theft, and litter. Kinds of deviance that may be distracting include rest rooms with heavy graffiti, theft of a backpack or wallet, or breaking and entering a vehicle at a trailhead. Yet we know there is discrepancy between values and behavior (Clark and others 1971). With litter, for example, we believe it is inappropriate to litter, yet we do it anyway (Clark and others 1972, Heberlein 1971). Therefore, we need to monitor choices of behavior actually made rather than rely totally on what users say about their behavior.

Freedom and security are two primary qualities of the recreation experience that users expect. In fact, the nature, extent, and level of control over use are factors that characterize various recreational opportunities. Control measures range from subtle techniques, such as barriers for traffic control (a form of site design) and providing information to users, to more authoritarian kinds of control, such as law enforcement. The state of the art on social control is not advanced: dichotomies such as direct versus indirect, manipulative versus regulatory, or coercive versus benign approaches have been addressed in the literature (Christensen and Davis 1984, Fish and Bury 1981, Hendee and others 1978).

In dispersed areas, one of the values appealing to users is the lack of regimentation and control found with other kinds of recreation; this value was reported by nearly two-thirds of the campers in three dispersed areas in the Pacific Northwest (Clark and others 1984). Most of the dispersed area users who had been returning to the same location for about 6 years agreed that being free to alter campsites to meet their own needs--by setting up tables or building fire rings,

for example--was important. A sense of security is also important. Nearly 75 percent of campers and day users in this study reported feeling safe although they expressed a desire to be kept informed by recreation managers of potential dangers such as unsafe drinking water, poisonous snakes, and dangerous roads.

Similar results are found in the Downing and Moutsinas (1978) study of dispersed, roaded forest land users in the Pacific Northwest. Users want the opportunity to "do their own thing." They prefer little development and value privacy, freedom, and peace and quiet (Downing and Clark 1979).

Certainly freedom and security are values also expected in wilderness areas; however, they may take on a different meaning by wilderness users than users of dispersed or developed recreation areas. Some studies on wilderness user attitudes have shown support for trailhead registering, wilderness rangers patrolling the backcountry, some regulation of areas, willingness to accept more controls, and so forth. Charging entrance fees and assigning visitors to campsites are not favored by wilderness users (Lucas 1980; Stankey 1973, 1980).

Researchers do not know much about users' interpretation of freedom and constraint in outdoor recreation settings. Some users may arrive at an area; expect rules, official contact, or visibility of the ranger; and feel the absence if the controls are not present. Dissatisfaction and reaction may occur. Inappropriate social control may thus lead to dissatisfaction with the recreation experience: some users may desire and expect fairly comprehensive and explicit regulations, some may prefer no regulations. We do not know how much is too much and how little is too little in different settings or what effects these have on recreation choice behavior. Intrinsically, wilderness implies fewer controls and controls that are more subtle and benign in nature compared to those for other areas. In fact, we do not know if there are fewer rules in wilderness than in dispersed areas. Many policies govern practices in wilderness areas--these include policies on minimum impact hiking and camping, fire rings, and wood fires.

By contrast, developed settings for overnight or day use have many rules and regulations and expectations by the managing agency. Clark and others (1971) found that users of such areas expected to enjoy tranquility and solitude but did not seek exclusion from neighboring campers. Furthermore, campers reported that their recreational experience was not reduced by the presence of additional rules and regulations, sound of other campers talking and singing, or people bringing city conveniences to the campgrounds.

Freedom and security to people in developed settings may mean something quite different than freedom and security in the wilderness, backcountry, or dispersed areas. Lee (1972)

suggests that the everyday normative constraints are still present during some leisure behavior but perhaps operate at a low level of awareness. Users in developed settings still experience traffic constraints and prohibition of dogs off leash, for example, but not to the degree they do in the urban setting.

People recreate in different developed settings depending on their social group, their experiences, and their preferences for specific activities. If regimentation and official intervention exceed their expectations of appropriate control, dissatisfaction and, in some instances, reaction will occur. Reaction may include displacement and selecting other locations and opportunities for recreation where regimentation is less and more appropriate "in the eyes of the beholder" (Clark and others 1971). Reaction may also entail deviance: rulebreaking, theft, and vandalism. The question we pose is, "What are users' expectations of legitimate social control practices and policies over the use of space and social organization?"

## METHODS

To study the magnitude and dynamics of vandalism and other types of depreciative behavior, we have drawn data from two sources: questionnaires completed by agency managers and informal conversations with users in the Mount Rainier area of Washington State.

Managerial data are based on a comprehensive multi-agency survey conducted during autumn 1982. Agencies participating in the assessment included the U.S. Department of Agriculture, Forest Service; U.S. Department of the Interior, Fish and Wildlife Service, National Park Service, and Bureau of Land Management; and the U.S. Army Corps of Engineers. The census was conducted of managers working at various administrative levels in recreation or resource management, law enforcement, planning, maintenance, and cultural resource management in California, Oregon, Washington, and Alaska. Total questionnaires mailed numbered 667 with an overall return rate of 90 percent. For this paper, we extrapolated the responses of 36 managers in the Mount Rainier area to compare with values of users in the same region.

Informal contacts were made with users in Mount Rainier National Park and Mount Baker-Snoqualmie National Forest. Specific sites chosen for study were a Park campground and a range of day use and overnight recreation sites along a 30-mile stretch of Washington State Highway 410 northeast of the park. Study sites included: White River Campground, developed campground managed by the National Park Service in Mount Rainier National Park; Dalles and Silver Springs, two semi-developed campgrounds; and Greenwater drainage, a dispersed recreation area in the Mount Baker-Snoqualmie National Forest. Each study area was visited during two or three weekends throughout the summer of 1980

according to a predetermined systematic schedule. Forest Service researchers unobtrusively circulated throughout the recreation areas, reaching as many people as were available and engaging in informal and open conversation with users at their campsite. The resulting sample was non-random and did not represent all users at these specific sites. Given the exploratory and qualitative nature of the study, however, the sample was considered sufficient to identify the range of issues of concern to users and users' responses. Contacts with users were unstructured, thus users had an opportunity to express their feelings and judgments in a manner that did not restrict responses yet allowed for comparability between them.

A brief summary of users' and managers' characteristics is given in table 1. Four Federal natural resource agencies are represented in the sample of managers from the Mount Rainier area. Duties were described earlier in the paper. Most managers were in their present job for six years and had management and administrative responsibilities.

Table 1.--Selected characteristics of users and managers in the Mount Rainier Area

Study Participant	Percent (Number)
<b>Users:</b>	
Location where contacted--	
National Forest	63 (121)
National Park	37 ( 70)
Total	100 (191)
Approximate age--	
Under 18	1 ( 1)
18-30	27 ( 52)
31-50	50 ( 95)
Over 50	22 ( 42)
Total	100 (190)
Sex of user group--	
Male only	34 ( 64)
Female only	20 ( 39)
Male and female	46 ( 88)
Total	100 (191)
Number of visits to area--	
First visit	40 ( 53)
Once before	19 ( 26)
2-3 times before	17 ( 22)
4 times or more before	24 ( 32)
Total	100 (133)
<b>Managers:</b>	
Agency represented--	
Forest Service	69 ( 25)
National Park Service	3 ( 1)
Fish and Wildlife Service	8 ( 3)
Corps of Engineers	20 ( 7)
Total	100 ( 36)
Major duty of job--	
Management/administration	54 ( 19)
Law enforcement	6 ( 2)
Planning/evaluating	8 ( 3)
Combination of above	23 ( 8)
Other	9 ( 3)
Total	100 ( 35)
Other characteristics--	
Mean of 6 years at this position	( 35)
Mean of 6 years assigned to this recreation area	( 34)
Mean of 10 years working in any recreation area	( 34)
	(103)



The 191 users represented a mix of male and female visitors. The age distribution reflects the observer's estimate of the user's age and is accurate only as a general indicator. These users were primarily from western Washington; however, their history of previous visitation indicated a wide variation in the amount of past experience they had with the specific recreation location in which they were contacted.

#### MANAGERS' AND USERS' PERCEPTIONS

The perception data presented in this paper offer a beginning to understand choices users' make (Worchel and Cooper 1983, p. 524): different perspectives lead to different perceptions about what is available. This means that differences between managers' and users' perspectives relate to choices users make regarding recreation behavior. But as yet, we do not know to what extent these differences lead to changes in expectations users have or in choices users make.

Table 2 shows managers' and users' perceptions of problems in semi-developed and developed campgrounds in the Mount Rainier area. For a variety of reasons such as status, ideology, and function, there are major differences between users' and managers' perceptions regarding the seriousness of

the problems (Davis 1984). Taking semi-developed campgrounds, what is defined as "problems" for users--theft or vandalism of their equipment and conflict between users, is seen as even more problematical by managers, with a full 28 percentage point difference on the theft measure, 26 percentage point difference between managers and users on the vandalism issue, and a 41 percent difference on the conflict between users measure. Even more dramatic differences in perception between managers and users occur on issues of litter (58 percentage point difference) and rulebreaking (47 percentage point difference).

Turning to developed campgrounds, the data show similar disparities. Theft of users' equipment, an issue managers and users were divided on in semi-developed campgrounds is recognized as "somewhat" or "very much of a problem" by 90 percent of the managers but only 35 percent of users (55 percentage point difference). Vandalism of users' equipment, a problem articulated by only 39 percent of the users, was seen as "somewhat" or "very much of a problem" by 77 percent of managers. On the other measures, differences between the two groups remain sharply divided, with users trailing behind managers 55 percent on the litter variable, 44 percent on the rulebreaking measure, and 55 percent on the issue of conflict between users. Two conclusions have been drawn from these data. First, there are strong differences between users' and managers' perceptions regarding the seriousness of the problems. Managers indicate a far greater likelihood to perceive various impacts such as vandalism as a problem. For example, they have an entirely separate domain of concerns often unrelated to users' interests and needs. These differences suggest that rather than a presumed set of identical interests that are often said to prevail between managers and users, these two groups may have conflicting interests. Managers may set the general parameters for recreational opportunities, but to enable democratic choice by users, they must respond to users' specific interests and needs.

Second, social control and regimentation are invariably related to impacts. Regimentation, defined as the nature, extent, and level of control over recreational use, historically has had two modes. The literature has tended to contrast social control as polar opposites: direct versus indirect or coercive versus benign approaches (Christensen 1984, Christensen and Davis 1984, Hendee and others 1978). These dichotomous values, however, oversimplify the complex reality of social control for different recreational opportunities. Control practices vary across the recreational spectrum with more prevalent and possibly more coercive control

Table 2.--Managers' and users' perceptions of problems in semi-developed and developed campgrounds in the Mount Rainier area

Problem and Perception Group <sup>1</sup>	Semi- Developed Campground	Percentage Point Difference	Developed Campground	Percentage Point Difference
Percent (Number) <sup>2</sup>		Percent (Number)		
Theft of users' equipment:				
Managers	71 (24)		90 (21)	
Users	43 (97)	28	35 (58)	55
Vandalism to users' equipment:				
Managers	67 (24)		77 (22)	
Users	40 (117)	26	39 (69)	38
Litter:				
Managers	88 (26)		86 (22)	
Users	30 (105)	58	31 (64)	55
Rulebreaking:				
Managers	73 (26)		77 (22)	
Users	26 (109)	47	33 (67)	44
Conflict between users:				
Managers	69 (26)		77 (22)	
Users	28 (107)	41	22 (59)	55

<sup>1</sup> The question in the instrument was "How important are each of the following problems in this recreation area? Possible responses for managers were "not at all," "somewhat," "very much," and "do not know." Values for managers reflect the sum of responses "somewhat" and "very much" of a problem. Users' responses were "a problem" and "not a problem." The managers' questionnaire was structured; informal conversations with users were unstructured. Because the nature of instrument construction was different in the studies, results are tentative and suggestive.

<sup>2</sup> Numbers in parentheses signify the number of responses from which the percentages were derived.

toward the developed end of the recreational spectrum. Recent research suggests that impacts also vary across the spectrum (Christensen and Davis 1984, Christiansen 1983). Thus, as use of various opportunities changes and as impacts increase, regimentation can also be expected to change.

How likely are managers and users to agree on what constitutes effective prevention and control strategies? Table 3 provides some tentative answers. At developed campgrounds, the differences in perspectives between the two groups are sometimes sharp. For example, 88 percent of the managers believe that maintenance of facilities is effective as a strategy for preventing impacts, but only slightly more than half the users agree. Yet there is extensive literature on the positive effects of maintenance on reducing depreciative behavior (Boston Parks and Recreation Commission 1978; Christensen and Clark 1979; Samdahl and Christensen, in press). Although there are sharp differences in perceptions on site design, education, and incentives and rewards, the fact that users lag behind managers about 20 to 35 percentage points, suggests that visitors perceive the recreational experience far differently than managers. Only in the use of stricter enforcement do we begin to see the gap between users and managers closing, with users 18 percent behind managers.

Table 3.--Managers' and users' perceptions about the effectiveness of various prevention and control strategies in the Mount Rainier area

Management Practice and Perception Group <sup>1</sup>	Semi- Developed Campground	Percentage Point Difference	Developed Campground (Rural)	Percentage Point Difference
	Percent (Number) <sup>2</sup>		Percent (Number)	
Stricter enforcement:				
Managers	77 (26)		78 (23)	
Users	65 (96)	12	60 (50)	18
Education:				
Managers	88 (25)		90 (21)	
Users	60 (91)	28	68 (59)	22
Incentives and rewards:				
Managers	82 (22)		79 (19)	
Users	44 (77)	38	59 (44)	20
Site design:				
Managers	80 (25)		78 (23)	
Users	64 (67)	16	44 (34)	34
Maintenance:				
Managers	86 (28)		88 (24)	
Users	60 (60)	26	53 (32)	35

<sup>1</sup> The question in the instrument was "In your judgment, do you believe the following strategies would be effective in reducing problems that are occurring at this recreation area?" Possible responses for managers were "not at all," "somewhat," "very much," and "do not know." Users' responses were "effective" and "not effective." The managers' questionnaire was structured; informal conversations with users were unstructured. Because the nature of instrument construction was different in the studies, results are tentative and suggestive.

<sup>2</sup> Numbers in parentheses signify the number of responses from which the percentages were derived.

Shifting to the semi-developed campground, two variations from the developed campground emerge. First, there are substantial differences on all measures across the two opportunities. And, second, the directions of differences show two opposing patterns. On some measures, there is an even greater perceptual departure of users from managers. For instance, education is perceived by users as even less effective in semi-developed sites than in developed campgrounds; and users are half as likely as managers to assert the effectiveness of incentives and rewards.

On other measures, users are less divided over the effectiveness of specific strategies in semi-developed areas, as compared with developed sites. Again, law enforcement as a control strategy apparently is held in relatively high agreement by both managers and users, with users showing only a 12 percentage point difference.

In summary, these data point to the following conclusions: (1) there is greater disparity between managers and users on what constitutes a depreciative problem than on what to do about impacts; (2) the potential for conflicts between managers and users may be more pervasive regarding control practices than over users' potential or actual loss of quality recreation because of impacts; and (3) the failure of managers to communicate to users the rationale behind deploying strategies such as education, incentives, design, and maintenance may contribute to the incipient and unanticipated expansion of stricter law enforcement, which as these data suggest, both managers and users are more likely to agree is an effective control strategy. What this means is that this disparity between the two groups may be influencing managers' interaction with users in such a way that managers perceive users in negative ways; for example, as a cause of the problem. Furthermore, because managers see and experience more problems, they may promote negative interaction. Users, in turn, may respond negatively by withdrawal and deviance, thereby lessening the recreational experience. Our recursive model considers possible implications of this negative interaction.

#### RECURSIVE MODEL OF SOCIAL CONTROL

The apparent contradiction between freedom, the desired state for users, and constraint, the managers' mandate to protect property and resources, can be depicted using a recursive model. This model clarifies how mutually responsive elements in a system of interactions can produce unanticipated results. Such results occur when managers' perceptions of impacts are the sole or nearly exclusive source for defining a situation. In brief, the model shows the circular, or recursive effect of deviance: deviance may produce social control, the control may create negative reactions, reactions may increase the rate of deviance, and the deviance may contribute further to more control (fig. 1).

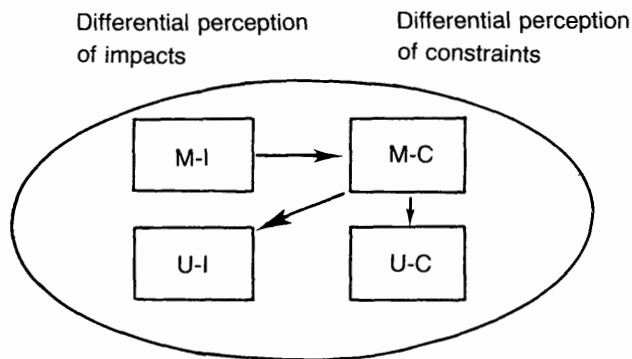


Figure 1.--Recursive model of social control. (M-I = managers' perceptions of impacts, U-I = users' perceptions of impacts, M-C = managers' perceptions of control, and U-C = users' perceptions of control.)

The differential perception of impacts by managers and users occurs because of different interests and needs of the two groups, and because the lines of communication between groups are absent or inadequate. Management thus develops an unshared definition of a problem, which becomes the sole or near exclusive definition of reality. Thus, fairly trivial impacts (for example, minor rulebreaking, simple graffiti and litter) may be interpreted by managers as more significant signs of the general breakdown of all rules. Despite the selective (and often distorted) definition, management puts pressure on the control system and on users to accept this definition of reality by instituting more rules and regulations (see Lemert 1972 for a discussion on adaptive control). Users' perceptions, where they disagree with managements' definitions, are either ignored or presumed to be identical with managers' views, and there is a general move toward the extension of control. Thus, external controls, such as law enforcement without users' consent have the paradoxical effect of creating social reactions, including a new round of rulebreaking by resentful, disgruntled, or excluded users. Displacement of users may also occur.

In this way the stage is set for increasing the credibility gap between authority and users with predictable consequences: users' reactions further generate management restrictions. Given this context, the recursive effect is inevitable. Increased constraints curtail users' margin of freedom and a rise in deviance leads to managements' further dependence on restrictive approaches to tighten security.

Specifically focusing on the model, the direction of the arrows indicates the direction of influence or dominance. Managers' perceptions of impacts

(M-I) obviously influence controls (M-C) they put into place. A recent example in a major urban area in the West began with rowdiness and vandalism (knocking down a few signs). Users were displaced by a few controls: removal of the parking slips, placement of "no parking" signs, and planters strategically placed around the area. Users' perceptions of appropriate controls (U-C) may be deemed irrelevant and may be ignored if they do not understand or agree with them. To avoid conflict, managers need to explain the rationale behind rules and practices. Legitimate feedback from users, rather than "catch as catch can," is also needed. Some users have more input than others in the establishment of policy and rules; for instance, wilderness users. The recursive model does not apply across the entire spectrum of opportunities; it is for developed and semi-developed campgrounds.

Similarly, managers' perceptions of controls (M-C) are imposed on users' definition of (U-I) possible sanctions if they were to break the rule. For example, a sign in Yosemite may read: "Please do not feed the bears." A user may feed the bear anyway even though they are aware of a fine if caught. Users' perceptions are affected by controls: they may lead to a greater feeling of safety or to the belief that users' freedom is curtailed. The model suggests users may not be heard regarding definitions of rulebreaking and appropriate controls. Users are guided by knowledge of sanctions and self management; constraints come from authority: "Can I park here?" "Can I have a fire here?" "Can I get firewood here?" Here, we are dividing social control between definitions and practices--the concepts, images, and language ("discourse"). Managers initiate a discourse based on the ideas and the images that users are rowdy, potential vandals, or deviants. This may lead to overreaction rather than to correct assessment of the recreational situation.

## CONCLUSIONS

How can the recursive effect of the buildup of deviance and control in recreation settings be prevented? Given that this model points out the most negative potential outcomes between managers and users, how can freedom and constraint be balanced in this system? How can users' choices genuinely be respected in the recreational environment at the same time that managers must protect the public domain? The polar distinctions of freedom or constraint need to be amended to a unified conception of freedom and constraint, given the variety of different recreation opportunities. This requires alternative strategies of open communication, linkages between management and user groups, more dependence on informal and benign control practices, limited use of coercive controls, and other approaches that rely more explicitly on users' expectations. Such adaptive control suggests a greater opening for volunteerism and other user-centered approaches. The flexible system would adopt a variety of interventions (social control) useful for different

recreational contexts and would also integrate users at various points in the system.

Future research should address the extent to which certain types of environments, impacts, or controls encourage or discourage visits. The research should entail the kinds of conditions users find acceptable, including the forms of vandalism and regimentation that deter users from enjoying the full range of recreational opportunities and returning to formerly visited areas. In this proposed research, it should be imperative to clarify the users' perspectives in terms of what freedom and constraints mean in various settings.

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RESOURCE AND ACTIVITY SUBSTITUTES FOR  
RECREATIONAL SALMON FISHING IN NEW ZEALAND

Bo Shelby

**ABSTRACT:** Substitutes become an issue when people are constrained from participating in desired activities. This study investigates and compares activity and resource substitutes for recreational salmon fishing in New Zealand. Results suggest that resource substitution and inventories need more attention, user perceptions of substitutes are important, substitutes can be asymmetrical, activity substitutes may be hard to find, and substitutability studies need to be integrated with availability studies.

INTRODUCTION

Substitutes become an issue when individuals are constrained from participating in a desired activity. Constraints on participation (Baumgartner 1978) can be externally imposed (e.g. resource areas closed by non-recreational uses) or based on individual limitations (e.g. insufficient time or money to participate). In either case, the individual can compensate by: (1) selecting a different activity which meets particular needs; (2) choosing an alternative resource to continue participation in the original activity; or (3) deferring participation to a more auspicious time (Vaske and Donnelly 1982). The aim of substitutability research is to understand the constraints people face and their subsequent compensatory processes.

The most common approaches to recreation substitutability correspond to the first two compensatory processes. Accordingly, substitutes have been identified between recreation activities and between recreation resources or sites. The former has received the most attention.

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Activity Substitutes

The most commonly accepted definition of activity substitutability is "the interchangeability of recreation activities in satisfying people's needs, motives, and preferences" (Hendee and Burdge 1974). Factor or cluster analyses have generally been used to construct activity groupings based on empirical intercorrelations. The measures employed in the analysis include participation rates (e.g. Moss and Lamphear 1970), reported preferences (e.g. Chase and Cheek 1979), and perceived similarities between pairs of activities (e.g. Becker 1976).

Activity groupings have also been based on the kinds of satisfaction sought by participants (Tinsley and Kass 1978; Hawes 1978). Measures of "satisfaction" such as getting along with others or utilizing abilities are factor or cluster analyzed to create groupings that are similar in terms of the satisfactions they provide. The assumption is that activities satisfying similar needs are substitutable.

Activity groupings have also been formed on the basis of the social groups with which an individual participates (e.g. Field and O'Leary 1973). The assumption here is that the basis for participation may lie in the social group experience rather than the activity itself. Activities within groupings are considered interchangeable because they provide the same type of group experience.

The assumption in all these approaches is that because activities are intercorrelated on one of these dimensions they must provide similar satisfactions and are therefore substitutable. Although this makes sense at some levels, some researchers have argued that even similar activities may not provide the same satisfactions, depending on factors such as the activities in question, the "style" in which they are performed, and/or the characteristics of the user. In addition, intercorrelated activities may be complementary rather than substitutable.

For example, Christensen and Yoesting (1977) used four activity types (games and sports, hunting and fishing, nature appreciation, and motorized activities) from an earlier study to see if respondents considered other activities within an activity type to be good substitutes. On the average, only 60 percent of respondents could substitute within an activity type; activities in the games and

sports type were most substitutable (almost 70 percent), while those in the hunting and fishing type were least so (45 percent).

In a study of two hunting activities similar in form, Baumgartner and Heberlein (1981) found that deer hunters perceived fewer substitutes than goose hunters, apparently because deer hunters placed more importance on the process of participation, the goal of the activity, and social interaction. It appears that activities will have fewer substitutes if numerous elements of a specific nature are rated important by participants. The results suggest that research on activity substitutes must consider the experiential elements of activities.

Vaske and Donnelly (1981) compare the activity type approach to a "direct question method" where respondents were simply asked to specify substitutes for a particular activity. Maryland turkey hunters who were displaced by season closure were asked to: (1) specify participation rates in a number of recreation activities (activity type method); and (2) indicate three substitutes for turkey hunting (direct question method). The activities predicted as substitutes by the activity type method accounted for only 15 percent of the activities specified as substitutes by the direct question method.

#### Resource Substitutes

A problem with the activity substitutes approach is that it often overlooks the physical context in which activities take place. None of these approaches focus on the resource itself, which is what managers can often manipulate most directly.

Economists have studied substitutes and complement relationships for years (Clawson 1966:90), although there are few empirical studies in the recreation field. Cordell (1976) explored the substitutability of public and private open space in urban areas. Demand for private recreational open space was significantly related to price of private space, quantity of public space, income, and two measures of the quality of private outdoor space (the proportion of land with creeks and golf courses). Income was the variable with the greatest effect, although Cordell argues that willingness to substitute has an effect independent of ability to substitute.

In a study more closely related to rural areas, Kurtz and King (1979) explored substitute and complement relationships for motorboat use of reservoirs in Arizona. Relationships were shown as cross-elasticities of demand, based on equations predicting the number of trips to each area from the costs (on and off site) of participation at each area. Results were explained in terms of characteristics of the individual reservoirs such as proximity to urban centers, access, travel time, travel distance, size of reservoir, facilities available, activities (fishing, water skiing, or cruising) and engine horsepower. Income was not a significant factor in explaining participation rates, presumably because the pro-

portion of income spent on boating at the reservoir was small.

These studies suggest the kinds of factors that might affect the substitutability of resources. The specific variables would change from one area to another, but issues such as access, facilities or developments for recreation, other resource uses besides recreation, perceived site impacts, use density, conflicting recreation uses, and the regimentation of rules and regulations, need to be considered from the resource point of view.

#### METHOD

The Rakaia and Waimakariri Rivers are located on New Zealand's South Island, flowing southeasterly out of the Southern Alps across the Canterbury Plain to reach the sea near Christchurch. These rivers have many of the same physical attributes and appear to offer similar recreational amenities. Both rivers have water right applications pending for large-scale irrigation development, and both are likely to be nominated for preservation under the new "Wild and Scenic Rivers" amendment to the New Zealand Soil and Water Conservation Act. These alternative uses are incompatible, and the possibility of a compromise solution depends partly on whether the two rivers are close substitutes and one could accommodate a shift of use from the other.

In this study, resource substitutability was approached from two points of view (see Shelby [1983] for a more complete description of the study). First is a review of existing information on resource characteristics describing the Rakaia and Waimakariri. These include river bed and catchment, geology, climate, proximity to population centers, travel times, road accesses, current recreational activities, regulations affecting recreation, agencies, river flow, fishery and fish habitat, and developments and facilities. The two rivers are compared in terms of these variables by organizing data already available.

The second source of information about resource substitutability is a questionnaire distributed to fishermen on both rivers. In order to determine their first hand knowledge about substitutes, fishermen were asked which of the ten South Island salmon rivers they had fished before. Fishermen then indicated which rivers were acceptable substitutes. For those considered not acceptable, they indicated the reasons why not. Finally, fishermen were asked to specify the "best" substitute river and evaluate this river in relation to the Rakaia or Waimakariri.

Activity substitutes were determined in two ways. Possible substitute fishing activities were presented in a list; respondents simply circled "yes" or "no" to indicate whether each was a substitute for salmon fishing and then indicated the location where the activity would take place. Fishermen were also asked to list the non-fishing activities that gave them the same type of satisfaction or benefit they got from salmon fishing.

Finally, level of commitment to an activity and knowledge of substitutes have been shown to affect substitutability. Commitment to salmon fishing was measured in terms of years spent salmon fishing, length of time spent on an average visit, where the respondent stayed on overnight trips, and a general item indicating the degree of personal involvement with salmon fishing. Knowledge of substitutes was measured by asking about fishing experience on other South Island salmon rivers.

Questionnaires were distributed on weekend days in February when the river was fishable and fishermen were present. An effort was made to contact all fishermen below the Gorge Bridge on sampling days, using vehicle access points, jet boats, and kayaks. The samples are thus drawn from fishermen present on fishable weekend days in February.

Of the 367 questionnaires distributed on the Rakaia, 146 were completed and returned, a response rate of 40 percent. Of the 400 questionnaires distributed on the Waimakariri, 121 were completed and returned, a response rate of 30 percent. The ability to send follow-up reminders would certainly have increased response, but because of limited resources, names and addresses of respondents were not obtained. Although disappointing, these response rates are close to what can be expected from a one-shot distribution effort under these kinds of conditions.

It is difficult to specify the extent to which the samples represent all Rakaia or Waimakariri fishermen because response rates are low and the samples represent only those present on fishable weekend days in February. We have no reason to conclude that these two factors bias the study findings, but that possibility does exist, and the results presented here should be viewed as suggestive rather than conclusive.

## RESULTS

### Substitutability Based on Resource Characteristics

The resource assessment revealed both similarities and differences. The rivers are similar in terms of length, channel, distance from the Gorge Bridges to the sea, geologic areas, and rainfall and climatic patterns. They serve much of the same populated area by the same highways, and are clear and fishable on roughly the same days. The rivers are different in that the Rakaia has a higher catchment, greater flow, wider braided channel, shorter gorge, greater distance from State Highway 1 to the sea, and lacks the extensive stop banks and facility development found on the lower Waimakariri. The Rakaia is farther from the Christchurch metropolitan area and has less road access in the area below the Gorge Bridge. The salmon run in the Rakaia has at least twice as many fish as the Waimakariri.

### Fishermen's Perceptions of Substitutability for the Rakaia

Rakaia fishermen were given a list of South Island salmon rivers and asked to indicate which ones were acceptable substitutes for salmon fishing on the Rakaia (see table 1). Over 70 percent agreed that the Waiau, Hurunui, Opihi, Waitaki, Clutha, and Rangitata were not acceptable substitutes. For these rivers the most common reason (given by 59-91 percent of respondents) was that the drive takes too long. Some fishermen (26-40 percent) also indicated that it is too expensive to fish on these rivers. A substantial number (36-46 percent) added low salmon numbers as the reason why the Waiau, Hurunui, and Opihi were not acceptable substitutes.

The Ashley and Ashburton Rivers were not acceptable substitutes for 100 percent and 88 percent of the fishermen, respectively. However, the length of the drive was less likely to be a

Table 1.--Rakaia fishermen's evaluations of possible substitutions for the Rakaia

Rivers	Substitute for Rakaia	-----If not, why?----- (percent checked)					
		(percent "no")	Drive Takes too long	Too expensive	Too crowded	Scenery not as good	Poor fishing conditions
Waiau	99	79	31	1	3	46	19
Hurunui	86	63	26	0	4	44	17
Opihi	94	61	28	10	7	36	44
Waitaki	95	88	35	2	0	16	11
Clutha	100	91	40	1	0	21	9
Rangitata	73	59	26	12	2	22	16
Ashley	100	32	13	3	9	55	55
Ashburton	88	26	12	16	9	46	53
Waimakariri	55	17	7	40	13	26	19



problem (26-32 percent checked this reason). For these rivers, 45-55 percent cited fewer salmon and 53-55 percent cited poor fishing conditions as reasons why they were not acceptable substitutes.

It is often assumed that fishermen can substitute the Waimakariri for the Rakaia. Of the Rakaia fishermen surveyed, 50 percent said the Waimakariri is not an acceptable substitute. The most common reason (given by 40 percent of respondents) was that the river is too crowded, followed by fewer salmon (26 percent), and poor fishing conditions (19 percent).

Rakaia fishermen were asked to choose the river which for them was the best substitute for the Rakaia. As the preceding data would suggest, almost half (46 percent) chose the Waimakariri, while 28 percent chose the Rangitata. None of the other rivers was chosen by more than 3 percent of the respondents, and 18 percent refused to choose a "next-best substitute," saying there was no substitute for the Rakaia.

In order to assess trade-offs between the Rakaia and Waimakariri, we asked Rakaia fishermen to indicate how many days of salmon fishing on their substitute river were required to give the same enjoyment as they got from one day on the Rakaia. Responses for those who chose the Waimakariri or Rangitata are shown in table 2. Only 12 percent said they were willing to give up one day on the Rakaia for one-half to one day on the Waimakariri; 31 percent would need one and one-half to two days on the Waimakariri; 28 percent would need three to five days, and 30 percent would need six or more. For those who chose the Rangitata, 15 percent would need one-half to one day, 39 percent would need one and one-half to two days, 27 percent would need three to five days, and 18 percent would need six or more. These results indicate that in general the Waimakariri and the Rangitata are not "equal" in value to the Rakaia for those who consider them the best substitutes.

Rakaia fishermen were also asked if any other fishing activities would give them the same satisfaction or benefit they got from salmon fishing (see table 3). Sea fishing was not a substitute for 84 percent, and lake salmon fishing was not a substitute for 85 percent. Flounder and perch

fishing were unacceptable for 94 percent and 99 percent, respectively. Trout fishing did provide the same type of benefit for 50 percent of Rakaia fishermen, but in a separate item 62 percent indicated that "For me no other fishing is a substitute for salmon fishing." Trout fishing may provide similar benefits for some, but the majority still contend that other types of fishing are not substitutes for salmon fishing.

Rakaia fishermen were asked if any non-fishing activities would give them the same satisfaction or benefit they receive from salmon fishing. Approximately 80 percent listed no substitute activities and indicated that "For me no non-fishing activity is a substitute for salmon fishing." Fourteen percent listed one substitute activity, and 5 percent listed two.

#### Fishermen's Perceptions of Substitutability for the Waimakariri

Waimakariri fishermen were given the same list of South Island salmon rivers and asked to indicate which ones were acceptable substitutes for salmon fishing on the Waimakariri (see table 4). Over 75 percent agreed that the Waiau, Hurunui, Opihi, Waitaki, Clutha, and Rangitata were not acceptable substitutes. For these rivers, the most common reason (given by 66-91 percent of respondents) was that the drive takes too long. Some fishermen (38-52 percent) also indicated that it is too expensive to fish on these rivers. A substantial number (25-39 percent) added that there were too few salmon in the Waiau, Hurunui, and Opihi.

The Ashley was not an acceptable substitute for 88 percent of Waimakariri fishermen, primarily due to fewer salmon (61 percent) and poor fishing conditions (56 percent). The Ashburton was not a substitute for 85 percent of Waimakariri fishermen. The most common reason (52 percent) was the length of the drive, but expense (32 percent), fewer salmon (30 percent), and poor fishing conditions (38 percent) were also cited as problems.

The Rakaia was an acceptable substitute for 80 percent of the Waimakariri fishermen. For those who said it was not, the major reason was the length of the drive.

Table 2.--Trade-offs between the Rakaia, Waimakariri, and Rangitata

	Days on Waimak to equal one day on Rakaia	Days on Rangitata to equal one day on Rakaia	Days on Rakaia to equal one day on Waimak
One-half to one	12	15	56
One and one-half	31	39	16
Three to five	28	27	18
Six or more	30	18	10
TOTAL	100% (58)	100% (33)	100% (88)
Average	5.5 (3-4 days)	4.7 (2-3 days)	3.4 (1-1/2 - 2 days)

Table 3.--Substitute fishing activities for Rakaia and Waimakariri fishermen

Fishing activities	Substitute for salmon fishing? (percent "no")		Z-value
	Rakaia Fishermen	Waimak Fishermen	
Sea fishing	84	74	2.0*
Lake salmon fishing	85	78	1.4
Flounder fishing	94	92	.9
Perch fishing	99	96	1.8
Trout fishing	50	44	1.0

\* means are significantly different,  $p \leq .05$ .

Table 4.--Waimakariri fishermen's evaluations of possible substitutes for the Waimakariri

Rivers	Substitute for Rakaia  (percent "no")	-----If not, why?----- (percent checked)					
		Drive takes too long	Too expensive	Too crowded	Scenery not as good	Fewer salmon	Poor fishing conditions
Waiau	94	76	44	0	0	36	18
Hurunui	81	66	38	0	0	36	18
Opihi	96	78	40	5	4	25	21
Waitaki	96	91	46	3	0	3	3
Clutha	100	93	52	0	0	11	8
Rangitata	76	68	38	9	2	4	4
Ashley	88	12	9	3	2	61	56
Ashburton	85	52	31	17	7	30	38
Rakaia	20	28	16	7	1	0	3

In order to assess the trade-offs between the Waimakariri and the Rakaia, we asked Waimakariri fishermen to indicate how many days of salmon fishing on their substitute river were required to give the same enjoyment as they got from one day on the Waimakariri. Responses for those who chose the Rakaia are shown in table 2. The majority (56 percent) said they were willing to give up one day on the Waimakariri in return for one day or less on the Rakaia; 16 percent would need one and one-half to two days on the Rakaia, 18 percent would need three to five days, and 10 percent would need six or more. These results suggest that the Rakaia is more nearly equal in value for the Waimakariri fishermen than the Waimakariri is for the Rakaia fishermen.

Waimakariri fishermen were also asked if any other fishing activity would give them the same satisfaction or benefit they receive from salmon fishing (table 3). Sea fishing was not a substitute for 74 percent, and lake salmon fishing was not a substitute for 78 percent. Flounder and perch fishing were not substitutes for 92 percent and 96 percent, respectively. Trout fishing did provide the same type of benefit for 56 percent of Waimakariri fishermen. In a separate item, 38 percent indicated that "For me no other fishing

is a substitute for salmon fishing."

Waimakariri fishermen were asked if any non-fishing activities would give them the same satisfaction or benefit they got from salmon fishing. About 65 percent listed no substitute activities and indicated that "For me no non-fishing activity is a substitute for salmon fishing." Twenty-six percent listed one substitute activity and 5 percent listed two.

In summary, most Rakaia and Waimakariri fishermen agreed that the Waiau, Hurunui, Opihi, Clutha, and Rangitata are not substitutes, primarily because the drive is too long. Both groups agree that the Ashley and Ashburton are not acceptable substitutes, primarily due to fewer fish and poor conditions, although more Waimakariri fishermen (probably those who live north of Christchurch) felt the Ashburton was too far to drive. Most Waimakariri fishermen felt the Rakaia was an acceptable and nearly equal substitute, but only half the Rakaia fishermen felt the Waimakariri was a substitute, and of lower value at that. Most objections to the Waimakariri centered around crowding and fewer fish. Waimakariri fishermen were a little more likely to view other

activities, both fishing and non-fishing, as substitutes for salmon fishing.

## DISCUSSION

Findings presented here suggest several interesting issues for substitutability research. First, what is the relative importance of resource substitutes versus activity substitutes? Activity substitutes have received the most attention, primarily at a theoretical level. But from a management point of view, resource substitutes may be more important. If constraints on participation are externally imposed (as when, a resource area is closed by non-recreation uses), public agencies may be obligated to provide an alternative setting which offers the same activity. It may not be enough to displace users and simply say "they can participate in other recreation activities." It is also possible that what were previously assumed to be called activity substitutes or replacements are really activity complements or alternatives, as discussed below. This issue needs further attention.

Second, studies of resource substitutes need to include careful inventories. Studies by economists (Cordell 1976; Kurtz and King 1979) have suggested the importance of variables describing important resource characteristics, and those assessed in the present study add to the list. Variables such as costs, proximity to population centers and user groups, access, travel times and distances, size of recreation area, climate, physical and geographic characteristics, activities possible, facilities available, and level of development should at least be considered. It may be that resources which appear similar at first glance are quite different when the details are known, as was found with the Rakaia and Waimakariri.

Third, information about resource characteristics needs to be interpreted in light of corresponding information about user perceptions of those characteristics. In the present study, for example, information about fishermen's perceptions of substitutes showed that driving time was more often a problem than expense. Crowding and the quality of scenery were less often cited as problems, although it is not clear whether this is because fishermen don't care about these two factors or because conditions are fairly comparable on most of the New Zealand rivers studied. (The latter explanation is suggested by finding that the most heavily used river, the Waimakariri, was the one where a large proportion of fishermen cited crowding as a problem.) The point is that perceptions provide the evaluative dimension needed to determine the importance of objective differences.

Fourth, resource substitutes are not necessarily symmetrical. The majority of Waimakariri fishermen felt the Rakaia was an acceptable substitute, but Rakaia fishermen did not feel that way about the Waimakariri.

Fifth, findings presented here suggest that different (non-fishing) activities are not good substitutes. This casts doubts on some of the activity groupings reported in earlier studies and suggests that intercorrelated clusters may represent alternatives or complements rather than substitutes. In addition, the present study shows that some forms of the same activity are not good substitutes, reinforcing the findings of earlier studies (Christensen and Yoesting 1977; Baumgartner and Heberlein 1981). The definition of the substitutability concept is particularly important here. For example, Vaske and Donnelly (1981) asked displaced turkey hunters what they would do "instead," which could include complements or alternatives as well as true substitutes or replacements. In the present study, we asked if other fishing and non-fishing activities would give "the same type of satisfaction or benefit," a more restrictive definition of a true substitute.

Finally, we need to integrate substitutability studies with "availability" studies of use levels and carrying capacities. Even if a substitute resource can be found and users perceive it as such, we need to know if the new area can accommodate a shift in use. This requires knowledge of the current use levels in both areas and the capacity of the new area. In the Rakaia and Waimakariri, for example, most fishing areas were already at or above capacity, and neither river could accommodate a major shift of use (Shelby 1983). This adds another dimension to the problem of actually providing substitutes rather than just talking about them at a theoretical level.

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PREDICTING THE IMPACTS OF A HIGH-VOLTAGE TRANSMISSION LINE  
ON BIG GAME HUNTING OPPORTUNITIES IN WESTERN MONTANA

Stewart Allen

**ABSTRACT:** The State of Montana, in cooperation with the U.S. Forest Service and Bonneville Power Administration, is conducting a five-year study on the impacts of a 500-kV transmission line on elk habitat and hunter opportunity. In fall, 1983, baseline data on hunting patterns and quality were collected from over 600 hunters interviewed in three western Montana study areas. A cluster analysis revealed seven types of hunters, each of which should be affected differently by the transmission line impacts. Hypotheses developed will be tested during two subsequent hunter surveys in 1985 and 1986.

**INTRODUCTION**

In the spring of 1983, Bonneville Power Administration (BPA) began clearing the right-of-way for a 158-mile-long section of a 500-kilovolt transmission line across western Montana. The line, which begins at Garrison, will transfer power generated at Colstrip to a substation at Taft, near the Idaho border.

The final route for the transmission line was chosen from many alternatives, each having different effects on the Montana environment. The State and Federal agencies locating the line gave considerable weight to social concerns in the siting process, choosing a route that crossed very little private land. In western Montana, this meant avoiding the valleys, instead crossing National Forest lands that provide a wide spectrum of wildlife habitat and dispersed recreation settings.

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In its final report on the project, the Montana Department of Natural Resources and Conservation (DNRC) said that the chosen route would affect fewer people and fewer homes than the other routes, but would have greater potential to damage natural systems (DNRC 1983).

Of particular concern was the potential for adverse effects on hunting opportunity; the line would cross areas providing secure summer and fall habitat for elk and other big game species. Among these were three areas that had been evaluated under the Forest Service's Roadless Area Review and Evaluation process (RARE II). These areas were released and will likely be subject to multiple-use management. Habitat security in roadless areas is essential to allow elk to hide from hunters (Lonner and Cada 1982).

Not only is hunting big business in western Montana, it is an integral part of many Montana residents' lifestyles, and probably one of the reasons many people choose to live here.

The line could have three main types of effects on hunting opportunities in western Montana:

1. The many miles of new and upgraded roads needed to construct the line and maintain access to the towers would increase hunter access to these areas, potentially increasing elk vulnerability and kill rates.
2. The increased access could make the areas less remote, both physically and perceptually. Hunters desiring a remote setting would be less satisfied, while road hunters or others desiring improved access would benefit.
3. The transmission line itself, with its 175-foot-tall steel lattice towers and 150-foot-wide right-of-way clearing, could intrude on the naturalness of the

area, decreasing the quality of the experience for hunters who value esthetics.

The Montana Department of Fish, Wildlife, and Parks (DFWP) is especially concerned about the effects of increased access, which is already a problem in western Montana. A 1980 survey of hunters in western Montana found that "...Forest roads and the access they provide are, and will continue to be, a serious threat to the future of big game management in Region 2" (Thomas 1980, p. 1). Asked whether motorized travel should be reduced or increased in the hunting district, 24 percent of the hunters interviewed at check stations indicated that access should be greatly reduced, and 23 percent felt it should be moderately reduced. Thirty-seven percent favored maintaining present access levels, and only 12 percent wanted to see access moderately or greatly increased. It was concluded that hunters support existing road closure policies and favor further reductions in road access during hunting season.

Big game species such as elk are also valued by people who don't necessarily buy a hunting license. To many, wildlife symbolizes environmental quality and the human relationship with nature (Shaw 1978). This study does not address nongame values of wildlife, but readers should keep in mind that decreases in elk habitat may be viewed as negative by hunters and nonhunters alike.

#### THE ELK MONITORING STUDY

The Department of Natural Resources and Conservation, in cooperation with BPA, the Forest Service, Bureau of Land Management, and Montana Department of Fish, Wildlife, and Parks (DFWP) is monitoring transmission line impacts on elk habitat and hunting opportunity, and will explore the potential to reduce any significant impacts identified. The monitoring program has three main objectives:

1. Determine the changes in elk use of summer/fall security area habitat due to the construction of access roads and operation of the transmission line.
2. Determine the changes in hunting opportunity and quality caused by operation of the line and access roads.
3. Provide for integration of the elk monitoring study data into future logging plans for specific projects and the forest planning process.

The 5-year monitoring program has biological and social components. Current animal use of elk habitat, the extent and quality of elk habitat affected by construction, elk response to construction and operation disturbances, and elk population characteristics are being measured through foot surveys and radio telemetry (Elliott 1983).

For the social portion, hunters are being interviewed in the field at three times: once before construction; once in 1985 after the line is built and energized; and again in 1986 to see if any changes in hunting patterns remain over time. The baseline survey will also serve as a pilot study, to help develop hypotheses and research designs for the subsequent phases.

The preconstruction survey was designed to obtain baseline information on current hunter use of the study areas and predict how different types of hunters will be affected by the transmission line. This required a description of current users of the study areas. We needed to know not only who they were, where they were from, and how often they hunted in the study areas, but why they chose the study areas as recreation settings, and how these areas compared to their other hunting grounds. This information should help assess the hunters' responses to changes in the hunting setting (Manfredo and others 1983).

Our principal concern was how changes in the setting would alter the chance of hunters having desirable experiences (Clark and Stankey 1979).

If the setting attributes valued by hunters change, and settings similarly valued are unavailable (or farther away), then current hunters may have to use the altered area, perhaps decreasing hunting satisfaction, or find a substitute. Of course, new hunters could be attracted to the altered setting (Anderson 1981).

This paper presents the results from the baseline hunter survey, conducted by DNRC in fall 1983. The following sections describe the framework of the study, research hypotheses, results, and what the conclusions mean for the Phase II (post-construction) survey and detailed impact assessment.

The elk and hunter studies are taking place in three areas located along the transmission line route: the Harvey/Eightmile; Middle Fork Rock Creek; and Packer Creek areas. These were chosen because they contain elk security habitat, support large elk populations, and represent the various climatological and vegetational characteristics of lands along the route.

In addition, the Forest Service is planning timber sales near each of the areas, which could add to impacts created by the transmission line and access roads. Another criterion was ease of measuring hunter use; seven check stations were adequate to cover primary access points into the three study areas. Car counters were installed by DFWP at or near each check station to compare use levels during general hunting season with use before and after.

Use of the Harvey/Eightmile study area, about 13,000 acres in the John Long Mountains south of I-90 and between Rock Creek and Hall, was measured by check stations at Harvey Creek and Beavertail. The Middle Fork Rock Creek study area, about 6,000 acres north of I-90 between Twelve Mile road and DeBorgia, was monitored by three check stations. The Packer Creek study area, about 9,600 acres located north of I-90 between Haugen and Saltese, was monitored by two check stations.

#### LITERATURE REVIEW

It is helpful to begin by defining hunting as a recreational activity in which people participate in a recreational setting to attain certain types of experiences or satisfactions, and thereby achieve certain psychological outcomes or benefits (Driver and Brown 1975, 1978; Manfredo and others 1983). By understanding what types of experiences people are seeking through hunting, we can learn about their setting preferences—how likely a given recreational setting is to meet their needs (Clark and Stankey 1979).

Hunting, like other recreational activities, is done for many reasons. Utilitarians may hunt primarily for the meat, and their satisfaction can be measured by the size or quantity of animals killed. Others may hunt to bag a trophy animal, gaining a sense of achievement from displaying the trophy. Others perhaps hunt to be outdoors, walking through the woods and enjoying natural surroundings. Sharing the experience with others, or even just getting some exercise, are also possible motivations for hunting. To other hunters, seeing wildlife in its natural habitat or having a chance to test their tracking and shooting skills may provide the greatest enjoyment.

Hunters seek these and other types of experiences in different patterns and levels of intensity (Hautaluoma and Brown 1978; Brown and others 1977; Hautaluoma and others 1982). Nearly every study of hunting has concluded that there is far more to hunting than killing an animal; hunting is enjoyable

for many reasons. In a review of 56 studies, Hendee and Bryan (1978) found that nearly all of the reasons people gave for hunting could be categorized under 16 general types of satisfaction people gain from outdoor recreation. This suggests that hunters share many goals with participants in other activities, such as backpacking. Ashor and McCool (1983), for example, found that hunters and nonhunters visited the Bob Marshall Wilderness for many of the same reasons.

Schole and others (1973) identified 12 sources of satisfaction among Colorado hunters, including being outdoors, socializing, and escaping from the daily routine. Potter and others (1973) reached a similar conclusion: "Hunting satisfaction is complex and consists of many elements or aspects of the hunting experience" (p. 220). Their study of Washington State hunters listed 11 dimensions of hunting satisfaction, that overlapped Schole and others' categories.

In a national poll, Kellert (1978) found that killing an animal, hunting for sport, and enjoying nature were the broad reasons given for hunting. He believed that although people hunt for all of these (and other) reasons, one reason should be the most important, and the others subordinate.

Once researchers identified the various dimensions of satisfaction, the next obvious step was to see if hunters could be grouped into categories based on their patterns of satisfactions derived from hunting. This would let resource managers gain a better understanding of their "clients," thus improving their ability to create and maintain satisfying recreational experiences.

This has been accomplished in several studies using cluster analysis to group hunters based on types of satisfaction they value. Such analyses first require identifying the dimensions of satisfaction for a given group of hunters. After the hunters are scored on each dimension, their scores across all dimensions are compared. Hunters having similar patterns of responses are grouped together, forming a hunter "type" having common reasons for hunting, attitudes toward possible management actions, and demographic characteristics. This method has also been used to type the attitudes of resource managers toward recreation activities (Allen 1979).

Hautaluoma and Brown (1978) used data collected in Washington State to identify 10 types of hunters, each having a different pattern of satisfactions across five dimensions: nature; harvest; equipment; out-group contact; and skill. The types

also differed on many other variables, including age when they began hunting, commitment to the sport, age, education, and income. Some types of satisfaction--enjoying nature and applying hunting skills--were important to nearly every hunter type. Other variables--desire for harvest and solitude--effectively distinguished one type from another.

Brown and others (1977) used the same method to define types of deer hunters in Colorado. They identified nine dimensions of hunting satisfaction, four of which were chosen for cluster analysis: easy hunt; harvest; out-group contact; and nature. Based on how much each of the four dimensions added to or detracted from their hunting experiences, eight hunter types emerged. The types also differed on attitudes toward three of ten possible management actions, including two dealing with increased access to hunting areas.

Elk hunting in Colorado has been similarly studied. Hautaluoma and others (1982) found that six sources of hunting satisfaction (outgroup contact, harvest, easy hunt, frustration release, in-group contact, and a broad dimension containing skill, equipment, excitement, and nature) were stable across four license groups (resident rifle hunters, nonresident rifle hunters, muzzle-loaders, and archers).

Depending on the license group, from five to seven types of hunters were found. Among resident rifle hunters, for instance, one type was low on all dimensions--potential dropouts of the activity who did not seem enthusiastic about any aspect of hunting. A second group was characterized by a high need for skill display, equipment use, excitement, and contact with nature, and by low needs for an easy hunt or releasing frustration. A third group was high on all dimensions, enthusiastic hunters who enjoy many aspects of hunting. The fourth type was also high on most dimensions, but had a low need for releasing frustration. The fifth group did not derive satisfaction from out-group or in-group social contact, and the sixth was not sufficiently unique to score one way or the other across the six dimensions. The authors used this information, plus the demographic correlates of the hunter types, to develop a brief case history for each group, outlining the similarities and differences among the various types.

This research has a clear application for resource managers. If hunting is done for many reasons, then a multiple-satisfaction approach to game management is necessary (Hendee 1974). The traditional approaches of using game killed or hunter days expended as measures of

recreational quality ignore many of the other, sometimes more important, aspects of hunting. Like other recreational activities, hunting is done for different reasons, and identifying these reasons--and for whom they are important--can help resource managers:

Rather than managing as if all users are alike, it is possible to conceive of the kinds of users according to the patterns of satisfaction they seek, the relative proportions of the kinds of users in the population, and the characteristics that distinguish the kinds of users from one another (Hautaluoma and others 1982, p. 79).

## METHODS

DNRC assumed that some hunters--those who value aspects of the setting that could be altered by the transmission line--will be particularly vulnerable to the types of impacts expected to occur. The key variables likely to predict vulnerability to impacts were isolated from the literature based on the anticipated effects of the line on hunting areas, and on the hunting satisfactions that seem most dependent on the settings that will be affected. Hunters were also asked to indicate on a map where they had hunted. The following variables were measured:

1. The role of nature, harvest, access, remoteness, convenience, and past experience in recreation setting choice;
2. Hunting style and success;
3. Hunters' evaluations of the study areas compared to other places they hunt; and
4. Age, residence, previous big game hunting experience.

DNRC asked hunters whether enjoying nature was extremely, very, moderately, slightly, or not at all important in their decision to hunt where they did. (This same response format was used in subsequent questions.) The larger the proportion of hunters for whom enjoying nature is important, the greater the chance the line would disrupt their behavior.

Two questions were used to tap the access-remoteness dimension: the importance of hunting in an area with few roads; and of hunting in an area with few other hunters. In phrasing the questions this way, DNRC assumed that the study areas were perceived as having few roads and other hunters; the study areas provide secure habitat because roads are sparse. Hunters saying these two reasons were not important in their setting



choice could, however, actually be saying that they do not consider the study areas to have these attributes.

The issue was split out because the impacts could be independent. For example, it might not be the roads themselves that people object to, but the likelihood that more hunters will use the area. Similarly, other hunters might not mind seeing more people, but object to being around vehicles, or simply being near a road. Each of these access items was scaled similarly to the question on enjoying nature.

Another question was designed to measure the perceived adequacy of the existing road system; hunters indicated whether, for hunting purposes, they believed the study areas contained too few, too many, or about the right number of access roads.

Because road hunters could have different views on appropriate levels of access than those hunting primarily away from roads, DNRC categorized hunters as road hunters or non-road hunters based on their responses to a question asking where they hunted.

Two Likert-scaled items similar to those described above asked hunters the importance of obtaining a trophy animal, and the importance of putting meat in the freezer. Although both involve killing an animal, hunters rating one of these as more important could be affected differently by the line. Trophy hunters would presumably be more concerned over effects on branch-antlered bulls, and meat hunters concerned about effects on all elk. Although these two aspects of harvest have often been lumped together in past studies, it was desirable to separate them to better define impact vulnerability.

Hunters were also asked how important hunting nearby was in recreation setting choice. If the most important reason someone hunts a given area is simply that it is close, then he or she may continue to hunt there, even if the setting is altered. However, if hunters value hunting nearby in combination with other experiences, such as being in an area having few roads, then any impacts on the study area gain significance.

We also asked hunters how many years they had hunted in the specific area they indicated on the map. Hunters using the area for the first year were formed into one group for analysis. The remaining hunters were formed into two groups, those who had hunted there less than or more than the median number of years hunted (not including first-time visitors).

Hunters who return to the same settings year after year can develop a knowledge of and affinity for these areas. Viewing the area as their "home range," they may respond with "territorial defense" to alterations of their hunting spots (Thomas and others 1973). They should therefore be more opposed to changes in the physical, biological, social, or managerial character of the resource than someone having little experience in the area (unless, of course, they find such changes beneficial). They should also be more apt to view the area as one of their favorite places to hunt, and to favor the number of existing roads in the area. Hunters return to an area, presumably, because they find aspects of it attractive. More experienced hunters should also be more specialized (Bryan 1979) and, therefore, more dependent on a specific area or type of area in which to hunt.

How the study area fits into the range of places people hunt in western Montana should be crucial in predicting both the magnitude and significance of impacts from the transmission line. If a person's favorite hunting spot is disrupted, the impact would be perceived as greater than if the affected area is just one of many places a person hunts. Hunters were asked whether the specific area was their favorite place to hunt in western Montana, one of their favorite places, one of many places they hunt, or whether they prefer to hunt elsewhere.

The survey was conducted during the 1983 big game hunting season, October 25 to November 27. The seven check stations, staffed for 91 person-days with six interviewers hired by DNRC, consisted of a State vehicle and two signs (one 500 feet up the road and one at the vehicle) similar to those regularly used by DFWP at its enforcement check stations. (In Montana, hunters are required by law to stop at check stations, even if they have not harvested any game.)

All hunters who stopped were asked to answer a few questions about their hunting trip. After identifying themselves, the interviewers administered the first half of the questionnaire, recording each hunter's responses on separate forms. If they were hunting in or adjacent one of the study areas, hunters were asked to complete the second half of the questionnaire themselves, and given a clipboard and pencil.

Hunters who had already completed a questionnaire on an earlier visit were not asked to complete another unless they were hunting in a different area or had killed an elk or deer. Repeat hunters (and

nonhunters) were noted to help interpret car counter data. (This report will not deal with that information.)

The first 2 days of the survey were treated as a pilot study, after which DNRC and the interviewers reviewed the questionnaire and check station methods, refining them as needed. Because no changes were made in questionnaire content, the data from these 2 days were combined with that from the rest of the study.

## RESULTS AND DISCUSSION

During hunting season, about 6,000 hunters passed by the seven check stations. Questionnaire data were obtained from 664 hunters. Respondents hunting elk in or within 1 mile of the study areas were also asked to complete the back side of the questionnaires, so some questions had a sample size of 525. Seven hunters went past the check stations without stopping, and seven more stopped but refused to complete the questionnaire, citing a variety of reasons (some of them quite colorful). The final response rate was thus high—98 percent.

The check stations efficiently sampled study area users; 89 percent hunted inside or within 1 mile of the study areas. Only one check station, Cabin City, sampled a high rate of people hunting elsewhere (40 percent). Most were hunting for the day (83 percent), while 9 percent were on a 2-day trip. Eighty-six percent lived in Montana,

and 36 percent of the sample lived in Missoula. Their average age was 36, and they had been hunting big game in Montana for over a decade (mean = 13 years, median = 10). The specific locations where they hunted were coded on a grid system for each study area.

Two-thirds of the hunters (67 percent) said that enjoying nature was an extremely or very important reason they were hunting in the specific area indicated on the map, while 10 percent said that nature was of slight or no importance. Hunters rated this dimension of hunting as the most important in setting choice of any reason listed, a finding consistent with past research. Hunters in the study areas were hunting close to the line's future path; 54 percent hunted to within one-half mile of the route, and 18 percent more were within one mile. Furthermore, 70 percent of the hunters would have to cross under the line to reach their hunting areas. This close proximity indicates that any esthetic impacts would be very noticeable, although some hunters may not mind the change.

Because 74 percent of those sampled hunted primarily away from roads, one would expect them to value remote hunting areas containing limited road access and not overpopulated by other hunters. This was the case, as over half (54 percent) of the hunters said that being in an area where there were few other hunters was extremely or very important in their setting choice (table 1). Only one-fifth said this was not much of a factor in their decisions. The

Table 1.—Hunters' ratings of the importance of reasons for hunting in the area  
(total sample, n = 528)

Reasons	Ratings				
	Extremely important	Very important	Moderately important	Slightly important	Not at all important
A. To enjoy nature	33	34	23	7	3
B. To put some meat in the freezer	30	23	31	12	4
C. To hunt in a remote area where road access is limited	20	20	31	13	16
D. To get a trophy animal	8	9	28	21	34
E. Because I (or others I know) have hunted here before	12	21	29	22	26
F. Because I live near here	15	17	21	15	32
G. To hunt in an area where there are few other hunters	28	26	25	10	10

other Likert-scaled question on remoteness found that 40 percent rated being in an area having limited road access as an extremely or very important reason in their setting choice (table 1). Twenty-nine percent said this was unimportant in their decision.

These findings can be interpreted two ways. The preference for limited road access and few other hunters could indicate a desire for solitude. It could also, however, indicate a concern over hunting success; increased roads and hunters could be viewed as more competition for game.

The hunters did not favor increased road access; 62 percent thought that the existing number of roads was about right, 27 percent thought there were too many, and only 11 percent felt the number of roads was too few. It is not surprising that the majority favored the status quo, for if they didn't like the area, they probably wouldn't hunt there, assuming better-liked settings are available. If the number of roads is altered, however, most hunters would prefer to see it lessened, not increased. Many comments volunteered by hunters dealt with access roads, showing the concern over this issue.

The hunters interviewed killed 20 elk, 38 deer, and one bear. About 900 hunter-days were expended to kill the elk, with 45 hunter-days required for each elk. This corresponds roughly to historical figures (DFWP 1978).

The primary aspects of hunting success—putting meat in the freezer and getting a trophy animal—were valued very differently by the hunters. As has been found in previous research, the prospect of bagging an animal for meat was a primary component of hunting. However, it was slightly less important than enjoying nature ( $t = 3.62, p < 0.01$ ). Hunting for meat (along with hunting in an area where there are few other hunters) was the second most important reason given for setting choice; 53 percent said this was extremely or very important to them (table 1). Only 16 percent said its importance was low.

Obtaining a trophy animal was the least valued reason of all listed, extremely or very important to only 17 percent. An equal proportion said it was only of minor importance, and 34 percent said obtaining a trophy was not a factor in their setting choice at all. Other aspects of hunting played a greater role in choosing the area in which to hunt.

Some hunters said they chose a hunting location in part because they lived nearby; 32 percent rated this as extremely or very important, compared to 47 percent who said

it was of little or no importance. Overall, this was the second-lowest factor in setting choice.

The other question, designed in part to tap a convenience/preference dimension, asked about the role of having hunted in an area before. Thirty-six percent said this was an extremely or very important reason they chose to hunt where they did, while a nearly equal number, 39 percent, said it was of little or no importance. No differences among check stations were evident ( $F = 0.77, p = 0.60$ ).

One-third of the hunters (33 percent) were hunting in the area for the first year, while 13 percent were returning for the second year, and 10 percent for the third. The overall average number of years hunting was 6. Two-thirds of the hunters were returning to their hunting areas, presumably because they found some aspect(s) of them attractive. For these returning hunters, the potential for impacts is high, particularly if the changes in the setting conflicted with peoples' desired experiences.

Sixteen percent said they were hunting in their favorite spot in western Montana, and 25 percent said it was one of their favorite places. Another 45 percent said it was just one of many places they hunt, and 14 percent said they prefer to hunt elsewhere.

For all hunters, evaluation was clearly linked to previous experience in the area. Among first-year visitors, only 3 percent were in their favorite area, 14 percent were in one of their favorites, and 29 percent said they prefer to hunt elsewhere. Among those having visited the area 6 or more years, however, 30 percent said it was their favorite, 32 percent said it was one of their favorites, and only 4 percent said they would prefer to hunt elsewhere. The longer people hunt in an area, the more likely they are to become attached to it and its many attributes.

Evaluation also tended to be linked to success. Among hunters who killed an elk or deer, 60 percent said they were in their favorite or one of their favorite areas, compared to 40 percent of the unsuccessful hunters. Nearly 90 percent of the hunters who said they were in their favorite area, however, didn't kill anything, suggesting that an area can be viewed very favorably even if no game is harvested.

Predictably, Montana residents differed from nonresidents, who were older (average age 42 vs. 35 for residents) and had less big game hunting experience in Montana. All of the out-of-State hunters were after elk,

and they killed one-third of the elk despite comprising only 12 percent of the sample. They were also more likely to see elk; 15 percent of the residents saw one or more, compared to 26 percent of the nonresidents.

The out-of-State hunters were thus more successful. Although many were not as familiar with the area, 44 percent were returning for at least the second time, and some may have been hunting with guides. Fewer of them were road hunters, 26 percent vs. 31 percent of the Montanans. They were also trying to harvest game for different reasons. Hunting for meat was less important than it was for residents ( $t = 4.6$ ,  $p < 0.01$ ), and obtaining a trophy was more important ( $t = 3.9$ ,  $p < 0.01$ ).

Even though out-of-State hunters were only a small proportion of the sample (<4 percent), they came to Montana in part to shoot a trophy animal, and seemed dedicated to this pursuit. They were also highly concerned with enjoying nature in the study areas.

#### Cluster Analysis

A primary goal of the survey was to determine the distributive effects of the line: who would view the impacts as positive; who would view them as negative; and who would be indifferent. We have hypothesized that the reasons hunters chose for hunting in the study areas will predict how they will react to the line-induced changes in the setting. To reach this goal, it would be valuable to group hunters together based on their reasons for hunting where they did; we could then predict how each group would respond to the physical, biological, social, and esthetic changes in the study areas. The cluster analysis technique used in previous studies of hunting seemed well suited for the task.

Hunters' responses to the questionnaire items on reasons for choosing hunting locations were selected to perform a cluster analysis. Clustering the hunters on these questions identified subgroups of hunters (hunter types) who had similar patterns of response. The cluster analysis was performed for the sample as a whole, rather than separately for each study area or check station.

The BMDPKM program (Dixon 1983) was chosen to perform the cluster analysis. Known as a k-means procedure, this hierarchical clustering method first assumes that all respondents form one cluster and at each step divides the cluster into two, based on how close each case is to the cluster center (measured by the Euclidean distance). Once the specified number of

clusters is reached, the program iteratively reallocates cases into the cluster whose center is closest. Hunters within the final clusters should be similar, and differ from hunters in other clusters (Hartigan 1975).

Because there was no predetermined basis for picking the final number of clusters, the program was run six times to obtain final cluster sizes of 4, 5, 6, 7, 8, and 9. Examination of the results showed that seven clusters best described the hunters, based on comparison of the cluster means for each of the seven variables, cluster sizes, interpretability of the findings, and the desire for a concise explanation. A cluster size of seven (which required 12 iterations to reallocate the cases into clusters) provided important information not present in smaller cluster sizes. Increasing cluster size, however, added little to the analysis while making interpretation more complex.

Cluster One.—This group, composed of 64 hunters (12 percent of the total sample), was characterized by the hunters' low ratings of importance on nearly all of the variables; as shown in figure 1, they rated five of the seven possible reasons as having little importance.

They did indicate that enjoying nature and hunting for meat were moderately to very important. These two reasons were rated as this important by all hunter types; everyone wanted to enjoy nature while hunting and also to put some meat in the freezer. As seen in figure 1, these two variables did not distinguish very well among the seven hunter types. Worthy of note, however, for this and the other hunter types, was whether nature or meat was rated as more important. Hunters in Cluster One rated hunting for meat as slightly more important than enjoying nature—one of only two types to do so.

Twelve percent of this group was from out-of-State, a proportion near the middle compared to other clusters. A full 65 percent were under the median age for all hunters; this group had one of the two highest proportions of younger hunters out of the seven clusters. Eighty-six percent were on day trips, a figure near the middle compared to other groups.

A relatively high proportion—35 percent—were primarily road hunters; it is therefore not surprising that they tended more than any other group to rate their hunting areas as having too few roads (although the majority still felt that the number of roads was about right). This group had the lowest rate of seeing elk and killing an elk or deer of all groups.

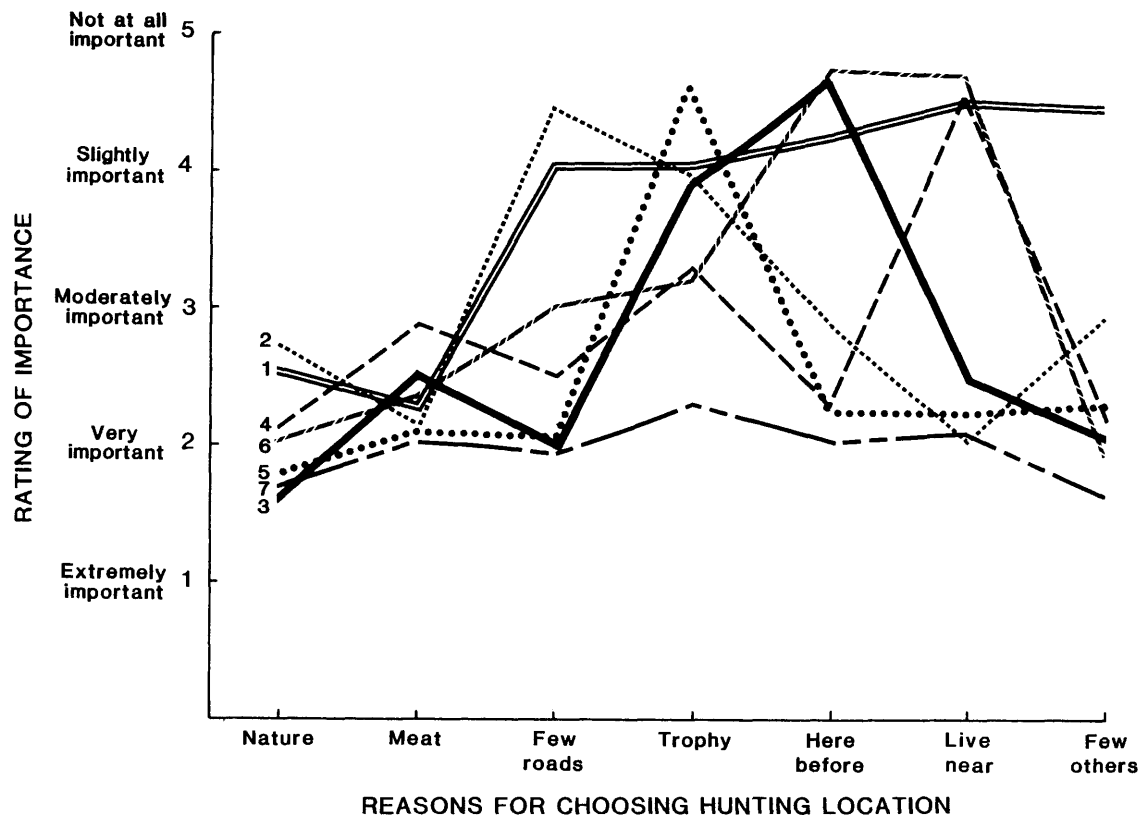


Figure 1.—Graph of cluster means.

Along with one other cluster, this group had a very high proportion of hunters visiting the area for the first time—52 percent, with only 22 percent having visited the area for 6 or more years. This group therefore did not rate the area in which they were hunting as one of their favorite places; only 6 percent said this was the case, the lowest proportion of any cluster. Similarly, 31 percent of this group said they would prefer to hunt elsewhere, again the highest percentage of the seven hunter types.

This group is particularly concerned with many characteristics of the study areas, and though most are from Montana, they didn't choose the area because it was close to home.

These hunters would either favor or not greatly object to the increased road access and would likely not be as concerned as other hunters with the esthetic changes in the setting caused by the transmission line. This group would not likely be displaced by the line, and they may even prefer the new setting to the old.

Attitudes toward possible management actions or restriction were not measured in Phase I, so we cannot be sure how this group

(or the other hunter types) would react. For all hunters, this is another possible source or impact that would probably be viewed by some as positive and by others as negative.

**Cluster Two.**—This group of 80 hunters (15 percent of the total) was the only other cluster to rate hunting for meat as more important than enjoying nature in choosing a hunting location. Hunting in an area with few roads was of little or no importance to them, but they did rate as moderately important being in an area with few other hunters. Obtaining a trophy was of little importance, but hunting close to home was very important in their hunting area decision. Having hunted in the area before was moderately important, near the middle of the seven clusters.

This group, interviewed mainly at Beavertail, Cabin City, and Haugen, contained only 5 percent out-of-State hunters. They tended to be older hunters, with 56 percent over the median age for all hunters, and contained more day hunters than any other type.

This group had the highest proportion of road hunters (43 percent), but also the highest proportion who said the number of

roads was about right. As many felt there should be more roads as fewer. They saw an average number of elk (89 percent saw none) but killed fewer elk or deer than did any other hunter type.

They had considerable experience hunting in the area; only 22 percent were hunting where interviewed for the first time, and 39 percent had been hunting there 6 or more years. Forty percent said they were hunting in their favorite spot or one of their favorite spots, and only 14 percent said they would prefer to hunt elsewhere.

These hunters are also not likely to be affected by the line, although the effects could be more adverse than for the first type. Although many are road hunters, they do not want to see more roads. Because they are more concerned with the number of hunters than with the number of roads, successful closure of new roads would probably effectively mitigate any adverse impacts, as long as large numbers of new hunters did not use the new access. Enjoying nature, although of moderate importance, was rated by this group as less important than by any other cluster, suggesting that any esthetic impacts would be moderate.

This group of hunters, 15 percent of the total interviewed, would likely not be displaced by the line; they would keep using the study areas as long as the game was still there; a decrease in the opportunity to shoot a trophy animal would not bother them greatly. However, those hunters who did not like the changes could have a more difficult time finding other attractive hunting locations; they have returned to these areas for many years, and a sizable minority are hunting in one of their favorite places. Even so, this group may not be strongly affected by the transmission line.

Cluster Three.—This was the smallest group (49), comprising only 9 percent of the hunters interviewed. They were characterized by their lack of concern for hunting for a trophy or in areas where they have hunted before, and the importance they placed on the other variables. Unlike the previous two hunter types, this group rated enjoying nature as much more important than hunting for meat, and rated nature, few roads, and few hunters as very important. Hunting near home was also valued by this group.

This group contained a low proportion of nonresidents (6 percent). They were older than other hunters, with 65 percent above the median age, and hunted mostly on day trips. A relatively high number (37 percent) hunted along and near roads, but

this group, more than any other, preferred to see far fewer roads in their hunting areas. This was the only cluster in which more hunters rated the number of roads as too many than rated the number as about right. They saw an average number of elk but were more successful (12 percent) than other hunters at killing an elk or deer.

These hunters were older and had more experience than other respondents in hunting in their areas; a full 47 percent had been returning for 6 or more years. They were average in the ratings of the area; 34 percent said it was their favorite or one of their favorite places to hunt, and 16 percent said they prefer other locations.

Because this group placed high importance on being in an area with few roads and few other hunters, the increased access accompanying the line will likely be viewed negatively. The very strong emphasis on nature, especially when viewed relative to the lower emphasis on meat, suggests that esthetic aspects of hunting may also be negatively affected by the line. A majority of the hunters may have a great deal of trouble finding other places to hunt if indeed they respond negatively to the changes in the setting, but some of these hunters value the study area locations highly, in part because of the close proximity to their homes. However, they are not particularly attached to an area simply because they have been there before (although they have extensive experience hunting in the area).

This is one of the few groups for whom esthetic impacts would likely outweigh game-related impacts. They could likely be displaced from the study areas, and if other settings were not available nearby, the impacts would gain significance. Of the first three clusters identified, this relatively small group (9 percent of the total sample) is the most vulnerable to the line's effects.

Cluster Four.—This group, the largest of the seven (100), comprised 19 percent of the total sample. They attached relatively high levels of importance to all variables except hunting close to home, which was viewed as having little or no role in their hunting area decisions. Enjoying nature was more important than hunting for meat; in fact, this group attached less importance than any other to hunting for meat. They were seeking areas having few roads and other hunters, and said that their previous hunting experience in the area was important to them. Obtaining a trophy was moderately important.

This cluster had the lowest proportion of Beavertail hunters of any subgroup (only

17 percent), with larger ratios of hunters from Haugen and Saltese. Nearly one quarter, 24 percent, were from out-of-State, the largest percentage of any cluster. About half were above and half were below the median age for the whole sample, and more of this group than any other hunted for more than 1 day—not surprising given the higher number of nonresidents in the group. Few were road hunters (20 percent), and only 5 percent thought that their hunting areas should have more roads. They saw more elk than any other type of hunter but were not quite as successful as most in killing a deer or elk.

One-third were hunting in the area for the first time, and about the same number had hunted there for 6 or more years. Forty-six percent were hunting in their favorite or one of their favorite areas, and only seven percent said they would rather hunt somewhere else. Like the other groups, most said the area where they were hunting that day was one of many places they hunt in western Montana.

These hunters are nonresidents and residents who value the esthetics of hunting more than obtaining a trophy or meat, although all aspects of their hunting choice were important. The exception was hunting near home; these hunters may be willing to travel farther to find hunting areas meeting their expectations. This may be disturbed by the line's effects on esthetics and access, but are apt to be slightly less concerned over any impacts on hunting success. It seems likely that if acceptable substitute settings were available, they would be willing to travel there, somewhat reducing the significance of the impacts.

Cluster Five.—This group of 79 hunters composed 15 percent of the hunters interviewed. Their main characteristic was a very high level of concern for all variables except obtaining a trophy. They attached as much importance as any hunter type to enjoying nature, getting meat, hunting where they've been before and near home, and to being in an area with few other hunters. No other group, however, placed less importance on obtaining a trophy.

Like most other groups, this contained a high proportion of hunters interviewed at Beavertail. Very few—only 3 percent—were from out-of-State, and their ages were mixed. Eighty-seven percent hunted for the day only; the rest stayed out for 2 or more days. A relatively low proportion (20 percent) were hunting primarily along roads, but about as many felt there should be more roads as felt there should be fewer. They saw and killed an average number of elk and deer, despite their extensive experience hunting in the area. Only 16 percent (the

lowest of all types) were first-time visitors, and 44 percent had hunted there for more than 6 years. More hunters in this group than any other said they were hunting in their favorite place in western Montana, and only 3 percent (the lowest of all groups) said they prefer to hunt elsewhere.

To these hunters, everything was important except obtaining a trophy. The importance they attached to nature, few roads, and few other hunters highlights their vulnerability to the new access roads and the line's esthetic impacts. They could also be concerned about decreased opportunity to obtain meat, though they probably would not object if their chances of obtaining a trophy decreased. For them, like the previous two groups, the potential for adverse impacts is high. However, the significance of those impacts is greater for this group, because they also place a high value on hunting near home and say that the affected area is one of their favorites. Impacts of the line may force this group to travel farther and hunt elsewhere, or stay in the same areas with a decrease in perceived hunting quality.

Cluster Six.—This group of 83 (16 percent of the total) placed relatively high levels of importance on enjoying nature, getting meat, and being in an area with few other hunters. Of very low importance were hunting near home or in a previously hunted area. The presence of few roads or chances of obtaining a trophy were moderately important.

Thirty-five percent of the group were interviewed at Beavertail, with Haugen and Saltese also represented. The second highest proportion were from out-of-State (20 percent), part of the reason for their low value on hunting near home. They were younger than any other group except Cluster One; 64 percent were below the median age for all hunters. More than any other group, they stayed out for over a day.

Only 23 percent were primarily road hunters, and the majority rated the number of roads as about right. Equal portions of the group felt there should be more or fewer roads. Twenty-one percent saw one or more elk, and 12 percent killed an elk or deer. Unlike the previous four groups, however, they were relatively inexperienced in the area; only 17 percent (the lowest of any group) had hunted there for 6 or more years. Like the members of Cluster One, most said the area was one of their many hunting grounds, and over twice as many said they prefer other places as said it was their favorite.

In terms of likely response to the line's effects predicted in Phase I, this

group is harder to pin down than the others. They have not hunted where they were interviewed for long, are not particularly attached to those areas, and didn't choose them to hunt near home. Seeing few other hunters was more important than being away from roads in their decisions, suggesting that road closures may be effective mitigation for those who either want fewer roads or feel that the current number is about right. This group may not be greatly affected by the line, compared to Clusters Three, Four, and Five. Yet, if they are, they could probably find somewhere else to hunt without great difficulty. They could be more concerned than groups One, Two, and Three if the supply of trophy animals were to decrease, but remain about as concerned as other groups over enjoying nature and hunting for meat.

This type of hunter may not be as vulnerable to the impacts as some of the other groups, but their behavioral responses are more difficult to predict.

**Cluster Seven.**—This group of 73 (14 percent of the total) has a profile that is immediately distinguishable from all other types. They rated every one of the possible reasons as very important, and their ratings across the board were as high or higher than those of any other group.

A low number, 7 percent, were nonresidents, but otherwise these hunters shared many characteristics of the nonresident hunters (except their concern for hunting near home). They were of average age, and 22 percent hunted for more than one day on their trip. This group had the lowest proportion of road hunters (only 12 percent), and the lowest number who said there were too few roads (3 percent); 40 percent wanted to see fewer roads in their hunting areas. A relatively large proportion saw elk, and a greater number killed an elk or deer (13 percent) than did any other hunter type.

Given this profile, one would expect them to be experienced in their hunting areas, and they were; 41 percent were returning for at least the sixth year, and only 19 percent were first-time visitors. A full 63 percent said they were hunting in their favorite or one of their favorite areas—far more than any other group.

This seems the group of hunters most at risk from the transmission line. They value hunting in an area perceived to contain few roads and want to see even fewer. They place great emphasis on success, both for meat and trophy, and said that enjoying nature was also very important. They are skilled hunters who are used to the study

areas and consider them one of their favorite places to hunt. They also value hunting near home.

These hunters would probably object to the line on many grounds, and their long-established hunting patterns could be disrupted. They may have a difficult time finding acceptable substitute areas to hunt if they are displaced.

## CONCLUSIONS

The results of the baseline study show that about 59 percent of the hunters interviewed have characteristics that may sensitize them to the transmission line's effects. Some hunters will view the changes as an improvement, and some will not care much one way or the other. The cluster analysis enabled DNRC to identify groups of hunters that will be affected differently by the line and to hypothesize how each will react to the setting changes. We cannot yet say what will precisely happen, but the next phase of the study will assess the accuracy of our empirically derived predictions and measure the type and level of impacts to hunting opportunity in the study areas.

The findings to date suggest that, for many, the impact magnitude will be high. Of the hunter types identified, Clusters One and Two (27 percent of the total) are not as likely to be adversely affected, and the net effect may be positive. This, of course, depends in part on what happens to the elk populations, which will be studied by the biological portion of the monitoring effort.

Clusters Three, Four, and Five (43 percent of those sampled), will likely be adversely affected. The net impact will depend on whether they have acceptable substitutes, but hunters in these groups chose the study areas in part for their perceived limited road access.

For hunters in Cluster Seven (16 percent of the total), both the magnitude and the significance of the impacts are likely to be high, and these users are the most prone to be displaced by the line. We may therefore anticipate finding fewer of these types of hunters in the sample during the next phase; this hypothesis will be tested after the line is built. If they continue to hunt in the study areas, it will likely be out of convenience and with decreased satisfaction. Again, this depends on the impacts to elk; if the hunting were to improve, for example, some of the negative impacts could be offset.

The effects on Cluster Six (16 percent) were difficult to predict. Hunters within



this cluster may respond differently, depending on how they interpret the impacts.

The magnitude of the impacts on the study areas, however, is only part of the picture; we must also examine the significance of these impacts—or how the study areas are viewed in relation to other hunting grounds. Hunters who do not like the changes in the study areas may not object if they have many other places to hunt that also meet their criteria (or meet them better than the study areas). The study area impacts must be placed in a greater context to interpret their significance. The next phase will accomplish this by asking hunters specific questions about how the attributes of the study area are perceived—before the line, after the line, and in relation to specific attributes of other places they hunt in western Montana.

Most of the nonresident hunters fell into the groups that would likely be adversely affected. Possible economic impacts to local communities could result unless these hunters find other hunting locations near the study areas. Assuming they continue to hunt big game in Montana, however, other communities could benefit. A complete economic impact study is beyond the scope of our research, and we can only speculate.

So far, we have talked about impacts to the esthetic, physical, biological, and social characteristics of the study areas. Another important aspect of recreational settings is the managerial situation (Clark and Stankey 1979).

If elk were adversely affected by the increased hunting pressure and loss of secure habitat, managers may have to impose stricter regulations. The questionnaire did not contain items on perceptions of hunting regulations, but the large number of comments received on the issue/points to its notoriety as a topic among hunters. It is clear that different types of hunters would react differently to new management actions. Previous cluster analytic studies of hunters have found that response to management actions can be predicted from hunter types (Hautaluoma and others 1982).

Reactions to management actions will be assessed during Phase II, when hunters have something specific to respond to (such as access roads). Hunters will be asked how they would prefer to see the new roads managed and will be asked other management-related questions. DNRC also

plans to assess the effectiveness of visual mitigation and to assess the actual esthetic impacts. Planned use of the study areas will also be measured, and it may be possible to study bow hunters, who were not studied during Phase I.

Access roads were an important consideration to five of the seven clusters identified, or 73 percent of the hunters. It may be that hunters of all types will react negatively to access roads if they are gated. Hunters who prefer limited numbers of roads may not approve, but neither would those who want new access roads without locked gates. In any case, it will be important to learn their reactions and see what proportion of hunters favors what management strategy.

For Phase II studies, a potential problem exists if current users are displaced, some hunters would not be there to interview if they decided not to hunt there at all. It would be valuable to talk with this group, because they would be the most adversely affected by the line (their behavior would have been changed).

This problem will be dealt with in two ways: one based in a change in methodology; and one by the type of analysis that has been and will be conducted. The change in method will be to administer the entire questionnaire to every hunter interviewed—regardless of whether they hunted in or near the study areas. This will provide a control group that has not hunted near the line. In addition, some hunters who do not like the changes in the settings may continue to hunt in the areas (out of convenience, for instance) and will still be there to interview. The baseline study found people who preferred to hunt elsewhere, and the next phase will too.

Second, the baseline data collected in 1983 will be compared to that collected during Phase II. Any substantial changes in hunter populations or types should be able to be detected. For example, another cluster analysis will explore similarities to and differences from the types of hunters now using the study areas.

Subtle changes may not be discernible or attributable to the line and its impacts. But this is compatible with the research goals, for it is likely that minor impacts would create less demand for additional mitigation. Substantial changes, however, would call for a closer look at the magnitude and significance of the impacts (Phase III) and at the need for further mitigation.

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# METHODOLOGY FOR STUDYING RECREATION CHOICE BEHAVIOR

## WITH EMPHASIS ON GROUNDED INQUIRY

Kent B. Downing and Roger N. Clark

**ABSTRACT:** This paper reports methodology for investigating recreation choice behavior using grounded, naturalistic research methods. How these techniques can be coordinated with other social research methods is described. Naturalistic methods are preferred over other approaches to uncover recreationists' decision making processes at work.

### INTRODUCTION

This paper reports on procedures using naturalistic, grounded, research methods for investigating recreation choice behavior. It addresses how these techniques might be coordinated with other social research methods. Substantive findings are reported by Clark and Downing in a paper included in these proceedings. Results presented in that paper are based on an integrated analysis of data from several different studies that used traditional quantitative survey research methods as well as qualitative methods.

The naturalistic model relies on field study and emphasizes the discovery of information about human behavior as it is affected by the context within which it occurs. The techniques of naturalistic inquiry are generally qualitative (for reasons that will be explained later). Theory development is grounded in data generated from field studies (Guba and Lincoln 1981). Glaser and Strauss (1967) refer to this as "grounded theory."

### Methodological Overview

Clark and Downing attempted to develop the basis for "substantive" as opposed to "formal" theory, as defined by Glaser and Strauss (1967). Substantive theory is developed for a rather specific topical or empirical area of inquiry, such as wildland recreation choice behavior or patterns of high-risk recreational activities. Formal theory generally applies to broader areas of inquiry such as the role of leisure in various lifestyles. "Substantive and formal theories exist on distinguishable levels of generality, which differ only in terms of degree" (Glaser and Strauss 1967); Glaser and Strauss further describe how formal theory may later grow out

of work begun initially in a narrower, substantive area.

The approach for model or theory building can be described briefly as follows: Naturalistic inquiry requires the investigator to study a phenomenon in its ongoing, real-life context. Being grounded is accomplished by building and refining models inductively through close, day-to-day processing of field data; theory is thus derived directly from data. As the investigation progresses and new factors and relationships are uncovered that are relevant to the emerging model, the model is modified. The fluid nature of the process renders quantitative analysis very difficult if not impossible. Quantification is delayed until it is needed when, for example, efforts turn to testing and verification of hypotheses deductively derived from the model.

### Motivation for Initiating Qualitative Inquiry

We explored the naturalistic, grounded, qualitative methods because of our uneasiness over the inability to explain or predict recreational behavior from studies relying on quantitative (primarily survey) methods alone. Most studies reported in wildland recreation research literature are descriptive; findings have not been generated that enable sociologists to predict specific behavioral outcomes. Knopf (1983) in discussing research on recreation preferences captured the essence of this concern:

"...data abound, theory does not...The normal process seems to be to collect as much descriptive data as possible, then search through it in hope of finding revelations about preference... data collection has taken precedence over confirmation or disconfirmation of theoretical postulates...As a discipline, we continue to suffer from an inability to predict in advance of data how and why recreationists are likely to relate to a setting. This is not a moot issue for recreation planners, who frequently are forced to make decisions without the benefit of available data."

Although the authors agree that advancement of knowledge of recreation values suffers from the scarcity of systematic verification, this paper discusses another equally compelling explanation for the inability to predict responses or choices of recreationists. Most investigations have failed to examine actual recreation choice behavior or to construct models consistent with the observed data. It is difficult to find studies that, as the basic methodological strategy, seek to develop theory which begins with and builds upon participants' behaviors and their explanations of those behaviors.

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To apply qualitative methods for purposes of understanding wildland recreation choice behavior, models were developed that account for factors people consider and the processes they follow in making decisions. Previous studies have not recognized the range of choices people make from one trip to the next. If models are to aid in predicting actual behavior, they must reflect tradeoffs people invariably must make in choosing to recreate in a particular way.

#### BASIC METHODOLOGICAL ISSUES

The fundamental approach for constructing models using naturalistic, grounded, qualitative methods is induction. It is a process of discovery and creativity based on careful observation of individual events. This is followed by interpreting, structuring, and modifying the emerging skeleton of an idea into a fully fleshed out model of the phenomenon of concern.

Can there be a logic to discovery? Some have argued "that there is no order or method in the process of discovery at all, 'the creative' side of science is wild and undisciplined" (Jarvie 1964).

Conversely, other philosophers, defining logic more broadly, (Norwood Hansen in physics and Abraham Kaplan in the social sciences) have argued that there can be a logic of discovery--that the probability of producing new views of the world can be heightened through persistence, chance, and intense creative thought (Austin 1978). In particular, the more active the investigator in searching, exploring, and playing with a diverse array of ideas, the more likely that new and meaningful discovery will occur. The debate on the relationship between deductive and inductive approaches to knowledge has occupied scientific philosophers for centuries and will likely continue.

The grounded, naturalistic approach contains the essential elements of the natural history approach, the origins of which are found in the work of Darwin, who is generally considered the originator of modern natural history method. Darwin's reasoning process combined both inductive and deductive logic. But Darwin expressed openly his suspicions of deduction. He always insisted upon careful and precise observation. Then, from the ordering of the facts, he constructed interpretations and theories (what we might refer to as working models or hypotheses) against which he tested new observations and facts. This view represents the core of the approach outlined in this paper.

We believe that where an understanding of and an ability to predict behavior relating to recreation are sought in real-life situations, the contextual settings where diverse behavioral responses occur must be recognized and worked within. Our research must account for choices made within the context of social relationships, recreation setting requirements, preferences, and other supportive and constraining factors.

Several assumptions underlie the approach:

1. A grounded approach will generate models of substantive phenomena from which hypotheses can be deduced that will have a higher probability of withstanding rigorous "scientific" testing.
2. A naturalistic, grounded approach will allow rapid development of models and hypotheses, which in turn, will allow faster verification.

Platt in his 1964 article in *Science*, "Strong Inference," devotes considerable attention to why some fields seem to move ahead more rapidly than others. He attributes this to the systematic application of an inductive intellectual process which he terms "strong inference." In its separate elements, strong inference is the old-fashioned method of inductive inference that goes back to Francis Bacon, yet in reality it consists of applying formally, explicitly, and regularly the following steps to every problem in science: (1) devising alternative hypotheses; (2) devising a crucial experiment or several of them with alternative possible outcomes, each of which will, as nearly as possible, exclude one or more of the hypotheses; (3) carrying out the experiment; and (4) recycling the procedure.

A formal diagram reminds the investigator to move ahead with the recycling process "without dawdling or getting tied up in irrelevancies" (Platt 1964). Platt writes that for exploring the unknown, there is no faster method; this is the minimum sequence of steps. As a result, strong inference offers a systematic method for reaching firm inductive conclusions one after the other, as rapidly as possible. Naturalistic, grounded methods, because of their responsiveness to new and discrepant data that point toward new phases of theoretical sampling, are particularly adept at facilitating the rapid development and refinement of hypotheses--grounded hypotheses likely to stand the rigors of quantitative and qualitative verification.

3. Model development and elaboration may proceed hand-in-hand with verification during some kinds of investigations (Deising 1971). Justification and verification need not be treated as a separate set of procedures occurring after "discovery," but can be included within the process of discovery. In some methods, verification is scattered throughout the process, and in others it occurs at one definite point. In some methods there are two or more kinds of verification, and in others there is only one. In any case, verification is always a subordinate part of a larger process of discovery; it constitutes the check point or points in the process (Deising 1971).

#### POTENTIAL SIGNIFICANCE OF A GROUNDED APPROACH

Grounded investigation of a situation/contextual/ecological nature is important from two perspectives:

1. Theoretically, to uncover the nature and structure of complex patterns associated with the out-

come of alternative choices. To understand a particular behavior, we must learn about the range of factors and their interrelationships relevant to the decision.

2. Practically, to determine which contextual factors can be manipulated by resource managers and to predict the consequences of changes that are beyond the control of resource managers. It should be added with considerable emphasis, that the lack of an integrated, behaviorally based, grounded theoretical perspective seriously complicates our ability to predict the relationships between resource inputs for recreational management (money, staffing, land allocations, and the like) and recreational outputs (numbers, types, behaviors, satisfactions, experiences of people, return visits, as well as decisions to avoid areas in the future--displacement and conditional displacement).

Evidence from our investigations suggests that from an ecological, ongoing, real-life perspective, people have a lot of things to choose from that are often conflicting--and choosing requires trade-offs. This gives rise to questions about users' decision processes and the factors they consider such as people, places, and management activities, as well as the interrelationships among the decision factors. Naturalistic field inquiry uncovered instances of each of the factors (and their interactions) as expressed in the questions in the following list. "Answers" to the questions do not necessarily require quantifying. In fact, quantifying may not be possible when addressing such questions until the types of variables inherent in them are better understood. Only after the processes at work have been discovered is it appropriate to begin measuring the direction and magnitude of the relationships.

#### Questions About People's Decisions, Choices:

What role do prior experiences, preferences for, and expectations about setting attributes play in choosing the site?

How does willingness to adapt to setting changes or the desire for and propensity to explore new and unknown territory influence choice?

How does habit or tradition influence choice?

How does knowledge of a range of options influence choice?

What effect does being in a particular group have in choice?

Why are "favorite" sites not necessarily those used "most frequently?"

How frequently do constraining conditions which confound the relationship between preferences and actual choices dominate the choice of settings?

#### Questions About Places:

What are the relative influences on recreational choice of macrosite attributes (canyons, river

valleys, mountains, lakes, deserts, seashores) as compared with microsite attributes (at a campsite or day-use area, for example)?

What changes at the macrolevel and microlevel are likely to lead to temporary or permanent relocation (conditional or permanent displacement), change in timing of visit, or change of activity?

What setting conditions are "necessary" and "sufficient," as opposed to "nice-to-have," to achieve overall trip satisfaction by the group or by each individual within the group? Does this vary depending on whether the outing is constrained by other decision factors or not?

#### Questions About Management:

Which macrolevel and microlevel characteristics are susceptible to management control or influence?

How do management factors associated with other resource uses (timber management, visual management, etc.) interact to affect recreational choice? How do they interact with factors beyond management influence?

Which managerial factors are most likely to change recreational choice?

Which strategies can minimize disruption to established users, particularly those who rate a setting among their most favorite or those who know of no acceptable options?

What role does information provided by managers about site options play in choice?

#### Questions About Complex Interrelationships:

What is the relationship between expectations of trip satisfaction and recreation choice when trade-offs are required among group, place, and activity?

How are we to represent the interrelatedness of the various decision factors? How can we represent the pattern complexity in an ecological framework or model that is scientifically verifiable and reflective of user concerns and behaviors patterns?

Are the concepts "necessary" and "sufficient" realistically applicable in understanding recreational choice?

#### RESEARCH PROCEDURES WITH CASE ILLUSTRATIONS

The procedures described below have evolved through application and field testing. The literature provided a basic approach for looking at the choice behavior process. This basic approach was modified as necessary to respond to the problems and opportunities encountered.

Because for many researchers the approach described will be somewhat different from that previously used,

initial applications will be slow and awkward--this is not an easy approach, although it appears to be so on the surface. By using this approach, it was possible to identify factors and their interrelationships that account, in part, for people's choices of particular macrosites and microsites for recreation. Progress to date, in the derivation of a grounded model related to choice behavior, is discussed.

A. Select and Define the Phenomenon of Interest. It May be Defined Quite Narrowly and Precisely or in More General, Open-ended Terms.

The Utah study (see Clark and Downing in this proceedings) originally had the objective of describing seasonal variation in dispersed recreational use of the North Slope of the Uinta Mountains. The underlying concern was to determine the extent to which recreation opportunities varied for the same area because of seasonal changes, and whether the users were the same regardless of season.

B. Survey Carefully the Literature in the Substantive Area of Interest. (Note, However That Some Theorists Argue That Literature Review in the Substantive Area of Inquiry Should at Times be Delayed Until Much Later in the Investigation as a Protection Against Prejudging Which Data to Collect and Which Interrelationships to Test. This Clearly is a Departure from Traditional Research Practice).

An exhaustive search of literature was not conducted in our study. The decision was to see what might result from taking the most extreme approach in applying the method. Only much later in our work were the results compared with other studies on dispersed recreation.

A comprehensive study was conducted of the varied views and procedures relating to the broad area of qualitative sociological research including naturalistic inquiry, ethnographic research, qualitative sociology, grounded theory, and the like. The general results of that effort were summarized at the beginning of this paper.

C. Enter the Field for Data Collection.

Dispersed recreation sites in two classes of the recreation opportunity spectrum were identified and mapped in the study area. This information was used in selecting locations in dispersed roaded areas in which to interview groups of recreationists. Contacts were made in locations that met the criteria for "roaded natural" and "semiprimitive motorized" as described by the USDA Forest Service.

Camping parties were approached and asked if they would be willing to discuss their recreational outing and if the comments could be tape-recorded. They were asked where they lived, what they were doing while in the area (asked to show on maps places they might hike or drive to to sightsee, fish, etc.), how long they had used the area,

what changes they had noticed, and whether they used the area during other seasons. In addition, they were asked why they were in the area rather than at locations closer to home. Finally, they were asked if they ever used developed campgrounds in the area, why or why not, and the conditions under which they would choose developed sites over dispersed sites.

The process is largely unstructured. A set of standardized questions is not asked; rather, the researcher probes in an open-ended way for a variety of issues related to the topic of interest. As new, relevant topics are encountered, they are also pursued. It is therefore imperative that the principal researcher be involved in the field; this work cannot be delegated to technical personnel, no matter how competent and qualified.

D. Analyze the Findings.

Following a period of interviewing (2-3 hours; 1-2 days) the comments were reviewed to see if the pattern of responses suggested other lines of inquiry (such as whether each party was at their favorite kind of place or doing their favorite activity).

"Scope" sampling (Willer 1967) or "theoretical" sampling (Deising 1971) was used, which means the investigator chose the next sample site(s) based on what was learned in previous interviews. For example, on the basis of widely scattered field contacts, it was decided that there was a need to talk to people in developed sites in the macrosite as well. It was found that some respondents in both kinds of settings in close geographic proximity were there because it was a preferred location; others were there for other reasons.

Careful probing disclosed that some members of the same groups were pleased with the microsite chosen (dispersed campsite) while others in the party wished they were down the road in a developed site with water, toilets, etc. Given the opportunity, they gave rational reasons for preferring to be elsewhere for that kind of outing. It was evident, however, that going on the outing for these people was preferred over not going at all--thus, a trade-off within the groups was apparent. It was decided to probe further for this phenomenon.

E. Reenter the Field.

Based on the analysis, the selection of interview locations and some of the questions asked were changed. Interviews in developed sites were added and those people were asked about their use of dispersed areas. Questioning was expanded to determine what other places they used for a similar kind of outing; why they were here, rather than at other locations; the conditions under which they would use other areas, rather than the sample site; if there were areas they had used previously for this kind of outing, but do so no more, and why they stopped using those areas. (The other acceptable areas and the areas no longer used were mapped and became sample sites for a small pilot study the following year).

The data were analyzed again and the process was finally ended when it was determined that no new factors and no new relationships among factors were uncovered to explain dispersed and developed site roaded recreation activities. At this point the model was "saturated" and ready for testing using other methods (quasi-experimental designs, survey research based on predictions of patterns of responses).

#### F. Match the Emerging Grounded Model With Literature.

The Clark and Downing paper (this proceedings) gives some initial interpretations of information in which the findings from qualitative and quantitative studies are combined. Both kinds of information were used to develop hypotheses for further field verification.

To match the grounded model with the results of previous research, it is necessary to pay close attention to areas of agreement and points of discrepancy between the model and reported findings. Discrepancies in particular may require the investigator to: (1) reenter the field and further modify the model or (2) systematically subject the competing ideas to a critical test.

#### G. Test the Model.

The authors are testing the model now in the Utah study and have initiated some work that is consistent with predictions from the model. Insufficient qualitative data, and certainly not enough quantitative data, have been generated to support any firm conclusions. Hypotheses have been formulated concerning what should be expected in other roaded forest areas. Hypotheses can be formulated concerning the effects of management activities on altering user patterns.

To test a grounded model several options can be used. A first option is to enter new, but similar areas to collect data necessary to test hypothesized relationships either qualitatively or quantitatively. An acceptable qualitative test occurs when a newly derived model does not conflict with the initial model. The test may, however, depart to the extent that new relationships are uncovered. A quantitative test is judged in terms of statistical agreement between predicted and actual outcomes that result from changes in the values of factors within the model.

A second option is to enter related but different areas to collect data necessary to assess the "fit" of the model in other contexts (Guba and Lincoln 1981). Does it apply to choice among developed ski area alternatives, for example. This concept is similar to assessing how far the model can be generalized.

In summary, the process described is highly iterative and heuristic. It places great value on the "discovery" of new perspectives and, given the diffi-

culties with predicting recreational behavior, this may be a strong point. Initially, there is little emphasis on the question of "how much" of anything is present because the investigator is open to various qualities that may later prove to be worthy of attention. Of greatest importance is "what to look for," and until a worthwhile focus is formed, quantitative measurements are of no importance. Indeed, premature efforts to quantify are luxuries researchers cannot afford in tight financial times.

Grounded, naturalistic strategies incorporate many standard social science tools; participant observation, in-depth interviews, and questionnaire surveys. Naturalistic strategies differ most strikingly from survey research in the degree to which the research design and data collection procedures may be adjusted during the course of the investigation. Grounded strategies must be adjusted if they are to take advantage of newly emerging data. As a result, a significantly different approach to sampling and data analysis is required. Traditional concerns with validity and reliability must be conceptualized in other ways as well (Dobbert 1982; Glaser and Strauss 1967; Guba and Lincoln 1981).

#### CONCLUSIONS

When is a specific data collection strategy appropriate or inappropriate? In describing alternatives to the traditional cross-sectional survey, Clark (1977) provides a framework for making choices. Two fundamental categories of questions must be considered: First, questions that describe events (what is happening? when? where? how much?); descriptions of participants (who is involved?); and descriptions of preferences (what do people prefer?). Second, questions arise about the explanations of events (why is it happening?) and explanations of change (how can behaviors be modified or changed?). Clark notes that no single combination of research design and measurement strategy will provide data to answer the variety of questions about a particular research phenomenon that are raised by researchers and managers. Methods must be chosen with reference to the nature of questions in need of answers.

The purpose of the efforts reported here has been to explore the contribution that qualitative, naturalistic, grounded inquiry can make toward gaining reliable knowledge about the sociology of natural resource use. It was decided to include this methodological approach in some of our studies in order to identify and understand processes by which people make recreational choices, choices of setting in particular. It was felt necessary to view this phenomenon from the point of view of the research subjects themselves--that is, to allow them the opportunity to describe the kinds of decisions they have made from one trip to the next, and to explain factors that weighed in the decisions. The research question that guided our investigation was: "What decision factors and interrelationships are evident in respondents' explanations of their actions, choices, and behavior?" We wanted people to tell us in their own words how they arrived at a particular choice of group, activity, and recreation setting. Their answers provided the elements to be incorporated into the model.



The authors anticipated that grounded, naturalistic approaches might allow quicker discovery of the range of factors involved in making choices, as well as something of the structure of the interrelationships among factors. Because the findings were grounded in actual behavior, it was expected that they would be of immediate interest and relevance in resource management decision making.

If the purpose of a specific investigation is to describe population characteristics, use patterns, etc., in statistically representative terms, survey sampling is an appropriate tool to use. Alternatively, grounded, naturalistic methods are highly preferred (and efficient) techniques for uncovering processes at work. They provide the means to learn more about the "why" of things (particularly when behaviors appear to be inconsistent with preferences); to model complicated interrelationships; and to identify the range of thought, emotion, and behavior occurring in real-life settings. If a grounded model has been properly derived, it offers a framework more likely to be capable of withstanding rigorous quantitative testing.

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Presents an overview paper and 11 contributed papers  
focused on the issue of the processes that underlie  
decision making by recreationists. The papers span a range  
of topics including the theory of choice behavior, empirical  
investigations of choice, and methodological approaches to  
the study of choice behavior.

KEYWORDS: choice behavior, substitutability, recreation  
settings, recreation experiences, setting  
attributes

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